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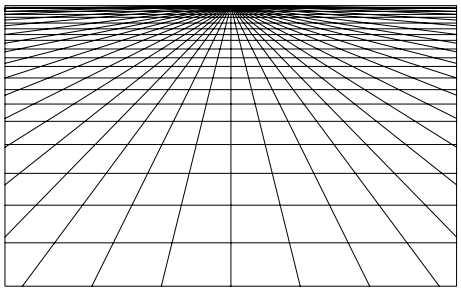

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Learning by e: Theoretical and practical approaches to e-learning in a competitive firm context

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Summary

This paper explores use of e-learning technologies for knowledge sharing and organisational learning in a competitive firm context. We combine evidence from literature with our own instrumental case study. The theoretical part provides the reader with an understanding of organisational learning and e-learning technologies. The theoretical inquiry resulted in our Organisational learning model, which structures the empirical case. The case consists of the customised e-learning programme "Expert on a day" developed for enhancing employees' knowledge and endorsement of firm values. The result points on outcomes of the e-learning programme in terms of learner experiences and learning effects, and identifies critical issues concerning successful implementation of e-learning.

Keywords: e-learning technologies, firm, organisational learning, knowledge diffusion

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1. Introduction

1.1. Background of the study

"Knowledge society", "information age", "learning economy" (e.g. Lundvall *et al*., 1994), "knowledge-based economy" (e.g. OECD, 1999) and "new economy" are concepts used for describing contemporary western society and economy. These concepts acknowledge the importance of *knowledge* and *learning*. The importance of learning in knowledge-based economies rests upon the underlying assumption that improved capability, individual and organisational, leads to increased organisational performance, which in turn will lead to economical growth, increased employee satisfaction, and thereby contributing to the welfare of individuals and the society as a whole.

Classroom teachings, through distance learning, using books and other written material, and apprenticeship relations where the apprentice follows the master in action are traditionally means of education and training. With the recent advances within ICT in the knowledge-based economy, alternative means of learning has entered the scene. E-learning is technology-based learning such as computer-based learning, web-based learning, virtual classroom and digital collaboration (E-learnframe, 2000:7). According to the e-learning business, e-learning are going to change and revitalise education and training (*SRI Consulting*, 2000).

The interaction between learning and technology makes e-learning technologies especially interesting for science and technology studies (STS). STS concentrate upon the impact of technology on social issues. Learning is one such issue. E-learning

technologies are evolving in an economy that hols knowledge as a crucial asset for production of goods and services, and learning as the process leading to knowledge. E-learning technologies are already an important actor in the education and training market. The business as a whole is growing and e-learning technologies carries the potential for developing learning further (e.g. Cone *et al*., 2001) and thereby leading to new benefits for society.

1.2. Objectives and methodology

In this study, we are going to explore the use of e-learning technologies for knowledge sharing and organisational learning in a competitive firm context, and identify critical issues for implementing successful e-learning. We combine evidence from literature with our own instrumental case study to narrow the gap between e-learning in theory and practice.

The aim of the literature study is twofold. First, we want to illuminate upon the theoretical and contextual background in which the e-learning technologies have emerged. Second, we will explore what e-learning technologies are and why they matter. A result of the theoretical inquiry is our Organisational learning model. We use our model to structure the empirical case study and use the results of the case study to evaluate the model. The objective of the case study is to explore e-learning in practice by focusing on the implementation of an e-learning programme in a competitive firm context.

We start in chapter 2 by exploring the role of training and learning in the economy since we are primarily interested in e-learning technologies for learning and training in firms. We discuss notions of learning, knowledge and organisational learning and end the chapter by presenting our Organisational learning model. In chapter 3, we explore the literature concerning e-learning and present e-learning technologies, the historical and contextual background and issues concerning development, design and implementation of e-learning. In chapter 4, we describe the empirical case according to our Organisational learning model, and use the empirical results to evaluate the relevance and importance of the variables included in our model. Finally, we discuss the critical issues and concerns for implementing successful e-learning.

2. Theoretical Approaches: The Economics of Learning and Knowledge

2.1. Introduction

Learning is one of the key interests of psychology and pedagogy, and now economy: "…if knowledge is the crucial resource and learning the most important process in the modern economy, we are, as economists, in trouble" (Lundvall *et al*., 1994:41). The key interest of this paper is organisational learning and the use of e-learning technologies for knowledge sharing in a competitive firm context. This field is important because knowledge of how to improve learning practices of in the economy can contribute to economic welfare and social development.

2.2. Learning and knowledge

What is learning and which role does learning play in the economy? To answer this question, we need to consider notions of knowledge since learning and knowledge goes hand in hand. Starting with knowledge, there are disparities within economics concerning the relation between information and knowledge and between tacit and explicit knowledge.

2.2.1. Knowledge and information

Knowledge differs from information in several aspects. Knowledge attaches to meaning, is context specific and relational (Nonaka & Takeuchi, 1995:57-58). Within economics, information and knowledge are often used in the same meaning, and thus. substitutable. Equalling knowledge to information infers that individuals and

organisations can learn by exchanging information. (Ancori *et al*., 2000:259). This stance is criticised for not including individual and organisational differences in learning and the acquisition of knowledge and skills. The observation that knowledge does not travel freely because of contextual concerns, contradicts this, which also leads us to the distinction between tacit and explicit knowledge and the assertion: "We know more that we can tell" are widely quoted from Polanyi (e.g. Lam, 2000; OECD, 1999).

2.2.2. The tacit – explicit dimension

When Polanyi discusses tacit knowledge, he claims that some elements of tacit knowledge can become explicit by statements (i.e. codified) whereas other elements cannot. Codification of knowledge implies some loss of tacit elements. A total codification is impossible. This is obvious with skills. An example will clarify this. Individuals can learn to drive a car to a certain degree from reading a manual or from receiving verbal instructions. Still, the relation between the exact movements of arms and legs on the pedals and steering wheel and the behaviour of the car and the road cannot be made explicit and remain tacit. The driver must learn it and internalised it by experience.

Serving our purpose, we do as Foray and Lundvall and differ between knowledge as more or less complex information and knowledge as skills or capabilities (OECD, 1996). The former consist mostly of explicit elements, the latter mostly of tacit elements. For information to become knowledge, it must contain a meaning.

According to Polanyi (1969:182) context or subsidiary elements carries the meaning[1]. Tacit knowledge is the residual of knowledge that will remain as context. Tacit knowledge is the sum of the relevant knowledge not attended to in the moment, learning history (e.g. prior experience with driving a car), personality as well as affective, cognitive, social and motivational aspects inflicting the individual in the situation (see Cowen *et al*., 1999 for further discussion). For our purpose, the main point is to differ between knowledge as similar to information, and knowledge as skills. In the remaining parts of the paper, we will use the terms *knowledge* and *skills* in this sense unless others specified.

2.2.3. Notions of learning

There are several notions of learning within psychology that differ according to focus of interest. What is certain is that learning is a multidimensional and complex phenomenon involving physiological, cognitive, emotional and social aspects. If we combine the different notions of learning within psychology, we end up with a concept of learning as relatively permanent changes in behaviour due to experience. Learning is brought upon changes in the environment, but not due to fatigue or changes in motivation (e.g. Chance, 1994: 28-30; Roediger *et al*. 1991: 197-198).

[1] [Polanyi (1969:144) claims that all knowledge is either tacit or rooted in tacit knowledge. He starts the line of argument by describing two kinds of awareness, *focal awareness* and *subsidiary awareness*. Focal awareness is what we focus our attention towards which we are directly aware. Subsidiary awareness directs our awareness or functions as a pointer (Polanyi, 1969:181-182). He uses the example of a teacher pointing at an object saying, "Look at this!" We attend the finger by following its direction and look at the object the finger is pointing towards, which becomes the focus of our attention. The finger no longer in focus, the object is. Still the finger carries meaning into the situation and tells us what to attend. In addition, we attend from the subsidiary elements to a focus of a whole. We cannot be focally aware of the finger and the object at the same time. This is the figure-ground principle described by the experimental tradition of Gestalt psychology. We cannot focus our attention

When it comes to notions of *learning* within economics, most focus on interactive learning. The simple and automatic types of learning do not play a significant role in the learning economy (Lundvall *et al*., 1994). With the distinction between knowledge and skills in memory, these are acquired through the processes of *conceptual learning* and *operational learning*, which reflects the separation between thought and behaviour. Conceptual learning refers to the ability to articulate a conceptual understanding of experience or *know-why*. Operational learning refers to the acquisition of skill or *know-how* (Kim, 1993).

2.2.4. Cognitive aspects of learning

The cognitive aspects of learning have gain most attention in the literature. Memory, attention and retention all are preconditions for learning and the acquisition of knowledge and skills. Learning occurs when the content is stored in one way or another and influence practice. *Scheme* refers to how knowledge and skills are stored and organised. Schemes are cognitive frameworks built and shaped by experience influencing behaviour (Chaplin, 1985:409). One of the most important contributors to the understanding of cognitive development of children, Piaget, describes the shaping of schemes through the processes of assimilation and accommodation. Assimilation refers to the process of fitting new experiences into structures or schemes already present in our mind. Accommodation refers to the process of changing our present schemes to a better fit to our experiences (Miller, 1993:35; Benjafield, 1992:285).

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to figure and ground as well as part and whole at the same time. The *figure* stands out as a whole and distinct, whereas *ground* is the indistinct parts not clearly shaped or patterned (Chaplin, 1985: 179).

Vygotsky, a contemporary psychologist of Piaget, advocated the importance of the social and contextual side of children's learning. He states, in line with Polanyi, that one cannot study human behaviour independent of context. Vygotsky's name is connected to the concept *zone of proximal development*. The concept refers to the distance between what the child can do alone and with help. Learning occurs in the zone between these two. This type of learning is oriented towards activity and interactive (Miller, 1993: 370-384). We believe that the concept is applicable beyond childhood, even though is a base upon studies of how children learning and develop.

2.2.5. Cognitive, conation, emotional and social aspects of learning

Studies of learning within psychology may have overstated the role of cognitive aspects like memory more or less omitting affective, intentional and social aspects (Martinez, 2001). The way we feel about the learning, the importance we give learner, our emotional state and the social setting amongst other factors influence our performance and the outcome of learning. In Polany's terms, these aspects are part of our subsidiary awareness (or tacit) in the learning situation. We tend to remember what is important to us and appeal to our emotions. Contextual clues support our memory and retrieval of episodes and facts. Retrieval resembles remembering, but it differs in the way that we might recognise and remember something when confronted with it without being able to recover it out of mere memory. We retrieve and remember episodes and facts more easily in settings similar to the settings it was learned. Remembering is an active not passive process. If not used, if not reinvested in, and with changes in context, knowledge and skills might deteriorate or be lost (Lundvall *et al*., 1994).

2.2.6. Learning outcome

Cognitive capabilities in addition to prior learning history, skills and knowledge of individuals inflict upon learning outcome, and might enhance, be neutral to, or contradict new learning. Computer skills for example might enhance e-learning outcome. Prior negative experience with computers might contradict e-learning outcome. Individuals learning history is part of the context that inflict and shape new experiences and thereby the learning outcome (e.g. Polanyi, 1969).

2.3. Organisational knowledge and organisational learning

Knowledge and skills of individuals are important for the production of goods and services in knowledge-based economies. Organisational knowledge is the sum of the joint efforts of individuals working under the umbrella of the organisation. Understanding the connection between individual and organisational knowledge is the key to understand the performance of firms. The major question for organisations to sustain and develop competitive advantage concerns the management and transformation of knowledge and skills into competitive products and services. The process for organisations to perform, adapt, change and transfer knowledge is organisational learning.

2.3.1. The tacit – explicit dimension of organisational knowledge

Economists have long neglected the concept of organisational learning. In production-based economies, economists focused on the automatisation of labour and work-practices and explicit parts of knowledge. Only recently has the importance of tacit elements of knowledge been realised. Tacit elements of knowledge are crucial for the

competencies of individuals and the competitive advantage of firms (e.g. Prahalad & Hamel, 1990; Hall, 1994). In a knowledge-based economy, one of the main issues is the transfer of individual competencies into products and services. I addition, we will argue that the level of automatisation of individual behaviour is important for individual performance and hence organisational performance. An example will serve this cause:

Novice drivers learning to drive a car need to learn where the pedals are, what the pedals do and when to press them. Drivers must coordinate the use of the pedals with the steering gear, gear lever etc. with the movement of the car according to the surroundings. All these aspects of car driving demand attention. As novices are more experienced, managing the technical aspects of car driving requires less attention. More attention can be directed towards the surroundings, e.g. traffic, a conversation with a friend in the passenger seat or in the cell phone. Expert drivers have reached a higher level of automatisation of knowledge and skills relevant for car driving. Expert drivers have a more nuanced perception of driving, are better to plan and separate relevant from irrelevant information, and thereby more efficient drivers. The link to economics is obvious. The level of automatisation of knowledge and skills are important aspect of the competencies of individuals and thereby organisations. Individuals having automated relevant knowledge and skills will perform tasks more efficiently than individuals that have not. They can direct attention to other aspects than the basic technical aspects.

The concept *internalisation* covers the transformation of explicit knowledge into tacit knowledge. The concept *articulation* covers the transformation of tacit individual

knowledge into explicit knowledge (Nonaka & Takeuchi, 1995). The process of articulation inflicts upon the performance of skilful individuals trying to put into wards what they are doing. To do so, they need to pay attention to aspects they normally do not focus upon, which will inflict upon their performance negatively making it less efficient[2].

In sum, articulation of knowledge benefits firms in several ways. Firstly, a common view is that explicit knowledge is easier to diffuse throughout the organisation. Articulation makes the organisation less dependent on single individuals and secures that important knowledge is not lost for the organisation despite individual turnover. Internalisation of knowledge on the other hand influences individual and hence organisational performance. Articulation of skills and knowledge inflicts upon the performance of the skilful individuals in the short run, but benefits the organisation in the longer perspective.

2.3.2. Organisational knowledge

Agryris and Schon (1996) discuss the connection between individual and organisational knowledge. An organisation stores knowledge in the minds of the employees, files of the organisation and in physical objects. Routines, norms and practices of the organisation embed knowledge, which individuals decode and use (Agryris & Schon, 1996:13). Organisational routines etc. are *theories of action*, which includes the strategies of action, values governing the choices of strategies and the assumptions on which they are based upon. This notion is similar to the concept of

[2] Try to walk as you normally do and describe at the same time in detail what you are doing and you will see that your walking will be peculiar and not so normal.

heuristics, which are mental shortcuts; strategies that experience teach us to use in particular situations. Hence, heuristics do not always provide the correct results.

2.3.3. Organisational learning

What is organisational learning then? We shall see that organisational learning concerns knowledge transfer. Organisational learning is more complex than individual learning, still individual learning often function as a model for our understanding of organisational learning. Organisational learning refers to increasing an organisation's capacity to take effective action (Kim, 1993). A more extensive definition of organisational learning is:

> An organisation learns when it acquires new knowledge or skills of any kind and by whatever means. To be organisational, the outcome of learning must be embedded in the images of the organisation held by its members' mind and/or in the epistemological artefacts (maps, memories, programmes, routines etc.) embedded in the organisational environment.

This is a slight modification of Argyris and Schon's (1996) definition of organisational learning. The key premise for learning to be organisational is that the learning content must be collective and embedded in the organisation, either in the brains or bodies of the individuals (as knowledge or skills) or in the artefacts and routines of the organisation. Argyris and Schon also pinpoint exclusion. Most important, the content of learning must influence practice to be organisational. Changes in performance due to changes in motivation and personnel turnover are not organisational learning.

Organisational learning starts with individuals making subjective insights and intuitions available for the organisation through different forms of knowledge transfer. *Internalisation* for example is the process for transferring knowledge from the organisation reshaping the knowledge and skills of individuals (Nonaka & Takeuchi, 1995). The effect depends on the interaction between the organisation and the individuals. Individuals add personal, subjective tacit elements to the content transferred. To what extent the content influences individuals depends on the fit between content, knowledge carrier, and the prior learning history, personality, cognitive, affective, social and motivational aspects of individuals. No learning occurs if the content is similar with prior knowledge and skills, only repetition. If the content is to complex, the learners will not understand the content. Learning occurs if the content is within the *zone of proximal development* of the individuals, through processes of assimilation or accommodation. Knowledge and skills changes when transferred. Individual and organisational aspects, characteristics of the learning object, as well as interaction between these, influence the outcome of knowledge transfer and thereby learning.

2.4. Summing up determinants of organisational learning

We differ between knowledge as information and knowledge as skills or capabilities. The former contains mostly explicit elements, the latter mostly tacit elements. Knowledge differs from information by being contextual and meaningful for individuals. The differentiation between knowledge and information opens for individual (and organisational) differences in the acquisition of knowledge and skills.

Organisational learning starts with the individuals. Several aspects of the learners and the teacher influence successful learning. On the side on the learner, prior knowledge, cognitive abilities (e.g. intelligence), affective aspects, conation (e.g. motivation, intentions, will etc.) and social aspects (e.g. social environment, communication) are all part of the tacit or subsidiary elements of the learning situation. The teacher must consider these aspects when designing and accomplishing of the learning object: if the content of the learning object fits the *zone of proximal development* of the individuals and the presentation of the content evokes positive feelings, interest and motivation. In addition, if the learners experience the learning environment as safe, positive, and similar to practice, the likelihood for successful learning increases. Here, a question rises concerning the compatibility between the learning object and the mode of learning. Simply put, is this a good way of learning this and will it influence practice?

For learning to be organisational, the content of the learning object must be diffused throughout the organisation, becoming a theory of action for the organisation. The organisation of the learning per se affects the outcome. Access in terms of technology and time, the presentation, incentives, assistance available for the individual learners, inflicts upon the learning performance. The cognitive capacity of firms refers to the capacity of the firm to acquire, adopt and use new knowledge or skills. Again, if not put into practice, it is not organisational learning. This is in large the model used for organisational learning and its outcome in this study. Figure 1 summarises the key variables in our Organisational learning model.

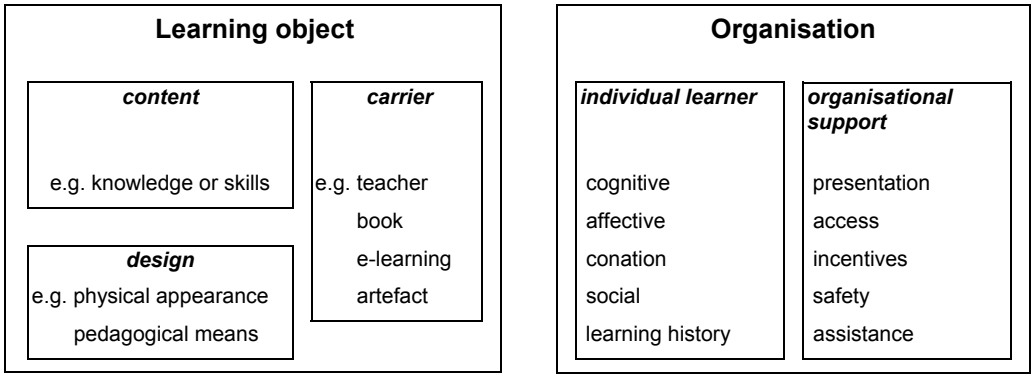

Figure 1. Organisational learning model.

3. Theoretical Approaches to E-learning: What is it and why does it Matter?

3.1. Introduction

Classroom teachings, courses, distance learning using books and other written material including individual assistance of a varying degree, and apprenticeship relations where the apprentice follows the master in action are typical vehicles for learning. E-learning represents an alternative to these methods. The high degree of technology involved makes e-learning special. E-learning technologies include e-learning applications and learning management systems (LMS). LMS are the "operating system" of e-learning managing and storing the learning content of organisations and firms (Govindasamy, 2002).

As with other technologies, social issues shape the development of e-learning technologies. We must look to the wider society and changes within it to describe e-learning technologies and the emergence of them. The transition from production-based economy to knowledge-based economy brought changes to learning in general, and firm learning and training in particular. Learning is a life long process rather than a process ending with graduation. In knowledge-based economies, a key to performance of firms are learning and training. The developments and changes within ICT, globalisation, merges of firms and changes in demographics are important for the emergence of e-learning technologies (e.g. E-learnframe, 2000).

In this chapter, we dwell upon e-learning, what it is and what consist of. We describe the historical and contextual background important for the for the use of e-learning in

a competitive firm environment. We discuss pros and cons of e-learning vs. traditional learning (t-learning) and search for critical factors for conducting successful e-learning. We start by giving a contemporary definition of e-learning.

3.2. What is e-learning?

E-learning is technology-based learning (TBL) and includes computer-based learning (CBL), web-based learning, virtual classroom, digital collaboration etc. E-learning represents a variety of technologies delivering content by all types of electronic media including the Internet, intranets, extranets, satellite broadcast, audio/video tape, interactive TV and CD-ROM. E-learning differs from distant learning and do not include text-based learning and courses conducted via written correspondence (E-learnframe, 2000:7).

The *learning management system* (LMS) is the operating system of e-learning. LMS provides the opportunity for registration, testing, tracking, and administration of learning and training, and makes the learning and training processes more or less automated (MacEke, 2000). With an LMS, all the information about the learning and training is stored, administrated and distributed from one place and the content reduced into small manageable parts or so called *learning objects* (LO). In theory, with standardisation of e-learning, it should be possible to put together LOs from different vendors independent of the LMS they are based upon. The standard most vendors follow today is the second version of the Sharable Content Object Reference Model (SCORM) (*e-learning,* 2002).

3.2.1. E-learning compared to traditional learning

The teacher or master[3] is the knowledge carrier transferring information leading to new knowledge or skills of the learner in classroom teachings and master apprentice relationships. These types of learning are highly social, the outcome depending on characteristics of learners (e.g. cognitive abilities, prior learning), the teacher (pedagogical skill, ability to adapt the content to the learner) and the social context of the learning situation (e.g. if it is safe, incentives etc.). Ideally, the teacher manages to adjust the content and choose pedagogical measures according to feedback and questions put forward by the learner. All these learning relationships are highly interactive and flexible. They also leave room for more informal exchange of information and experiences, both between the teacher and learner and among the learners. E-learning differs from these learning situations in several aspects, though the overall aim of learners gaining new knowledge or skills is the same.

In e-learning technologies, technology functions as knowledge carrier between teacher and learners. The knowledge of the teacher is transformed into the e-learning technology as information, including learning content and pedagogical considerations. In e-learning, the teacher and classroom are replaced by technology, in which the learning content and the learning context is embedded. The goal is that the learners acquire new knowledge and/or skills by interacting with the e-learning technologies. In traditional teaching situations like classroom teachings, the teacher organises the class, choose what to include and exclude, the level of the content, and how to present it. The teacher can adjust, adapt and change the level and the pedagogical means during the lesson. When it comes to e-learning, the teacher is separated from the

learner in time and space, making the content block more set and less flexible for changes along the way. The content block is thereby crucial (Hamid, 2002). One has to prepare the e-learning programmes in advance, think out possible problems that might occur and build in solutions for these. Obviously, this is time consuming and costly. On the other hand, when the programme is developed it is easy to distribute and redistribute to incremental costs, independent of time and space. In addition, learners can decide when and where to accomplish e-learning at the pace they want and retake it for repetition. E-learning solutions are more flexible than traditional classroom teachings where teacher and learners have to be present and a limited number of learners can attend classroom teachings. E-learning are learner lead whereas traditional learning are teacher lead.

Formal learning organised in classes at courses within a set boundary of time and place or within the boundaries of an e-learning programme is one side of learning. An additional side of learning is informal learning, i.e. learning and exchange of experiences occurring when people met, e.g. during breaks etc. A common critique towards e-learning, is that it typically does not capture social aspects of learning. Nevertheless, it is possible to build in tools for this, for example by including chat or discussion forums in e-learning solutions.

A common critique towards traditional learning is that the pedagogical mean often is talking about a topic of interest, which is a passive type of learning. Off course, not all teachers work like this and there are many pedagogical measures to pick from, problem-based learning to name one. Anyhow, e-learning is an alternative learning

[3] In the continuing parts of the thesis, we will use teacher, master and expert synonymously unless

situation using sound, graphics, and interactive features encouraging and more or less forcing learners to participate and be active.

Table 1 sums up common features of e-learning and traditional learning here exemplified by classroom learning. The table present a somewhat simplified and stereotyped picture. There is a variety of ways to conduct classroom teachings as well as to design e-learning programmes. Nevertheless, table 1 presents common experiences of these learning forms.

Table 1. Common features of e-learning and traditional learning

E-learning	*Classroom teaching*
The learner interacts with technology, e-learning programme	Interaction between teacher and learners, and among learners
Technology reconstructs the teacher and the learning context and functions as knowledge carrier	The teacher function as knowledge carrier, the classroom is the context
Flexibility in time and place. Retake possible	Set time and place. One time experience
Fixed learning situation. Once developed the content and pedagogical measures more are set	Flexible learning situation. The teacher can adjust content and pedagogical measures in response to feedback from learners
Learner lead. The learner decides the pace and what to focus upon	Teacher lead. The teacher decide pace and focus
Formal learning	Formal and informal learning
Unlimited number of learners	Limited class sizes
Active, doing	Passive, being told

other is specified.

3.3. Contextual and historical development

The literature describes several aspects influencing the emergence of e-learning technologies. First, the transition from a product-oriented economy to a knowledge-oriented economy has changed learning and training of firms. From being treated as a mere expenditure post for the benefit of the individual, learning and training are now considered important for organisational performance (e.g. MacEke, 2000). Education does not stop with graduation. Rather, it is a life-long process necessary for the competitiveness of individuals and firms (e.g. Cheong, 2002:340). The life cycle of knowledge and skills is shortening, adding more pressure on firms to deliver learning and training in a more rapid and efficient way to a lower cost (E-learnframe, 2000:33).

Second, developments within ICT in general and Internet in particular have influenced the emergence of e-learning technologies. In 1970, approximately 5% of corporate capital expenditure was IT related. In 1997, the share of high-tech related expenditure was approximately 50%. In 1995, Internet had 14 million users. According to International Data Corporation, the number will grow to 320 million users in 2002 (E-learnframe, 2000). Computer based training (CBT) existed before Internet. The content was stored and distributed through floppy disks and later CD-ROM. With the emergence of Internet, global distribution became easier. The improvements of computer capacity and bandwidth capacity, opens up for the transfer of more complex and larger clusters of information in a more efficient way. There are numbers confirming that more and more of education and training of firms are technology-based (E-learnframe, 2000).

Third, globalisation of market and trade has intensified competition. The developments within ICT have influenced the conduction of business, moving it towards e-commerce rewriting the rules of business. It is easier for firms to enter global commerce. With globalisation comes also increased cooperation between firms and merges of firms into multinational firms. This leads to new challenges for learning and training. The participation in a global market put new and different strains on the organisation of firms and the conduction of business. Globalisation leads to new demands of skills and knowledge relevant for the new global environment. Learning and training must be easily accessed throughout the organisation globally and available in different languages. Finally, with increased numbers of merges between firms, there is an increased need for diffusing the "new" brand and the values attached throughout the new organisation. E-learning can be a mean for reaching all employees throughout the new organisation (E-learnframe, 2000).

Forth and finally, changes in demographics in the western world with an increasing percent of the population being retired puts new demands on learning and training. The working part of the population must provide for the increasing numbers of retirees. A challenge is to prolong the time people stay in work life. Family patterns are changing. The number of single parent households is increasing as well as families with dual incomes, demanding more flexible learning and training solutions (E-learframe, 2000).

3.3.1. Why firms use e-learning

There are several reasons for firms to include e-learning in their training and learning solutions. The economical arguments for choosing e-learning for firm learning and training are strong. Even though e-learning is more expensive to develop and design compared to more traditional means of learning, the economical savings are connected to the implementation costs. With some modifications, according to choice of e-learning applications (i.e. synchronous methods), e-learning are available anytime and anywhere, with incremental costs of distribution. E-learning eliminates travel expenses and costs of employees spending time away from workplace. Even more important is the opportunity to reach all employees throughout the firm with learning and training (E-learnframe, 2000: 10).

Other benefits mentioned in the literature tangles the features of the knowledge-based economy. Learning and training are more closely linked to organisational performance that before (MacEke, 2000). Learning and training does not stop with graduation. In knowledge-based economies, knowledge and skills becomes obsolete in an ever faster pace, leading to need of continuous life long learning. Firms that can provide updated and consistent information to all employees when needed (learning on demand), have important advantages. Another advantage is the possibility to customise the learning material to the characteristics and needs of the individual learners. This is off course a more costly affair than designing one-size-fit-all e-learning, but is a measure to increase learning outcome. Finally, learners do not expose themselves in the same degree as in a classroom or at a course. Learners can train and learn from their mistakes without exposing themselves to colleges and leaders while making failures or mistakes (E-learnframe, 2000:11).

When it comes to limitations and disadvantages of e-learning, the literature is more sparse. Nevertheless, there seems to be a common understanding that the best solutions are shared solutions between e-learning and traditional means of learning (e.g. MacEge, 2000). E-learning for example, is not good for sophisticated learning where social processes to fulfil a task are more important than gaining new understanding or better practise. To master a skill fully, one need to practice, experience it and apply it in real-life situations. Shared solutions as combining e-learning with other methods like workshops might be more effective. A common mistake of firms starting to use e-learning is to overstate the technological aspects and underestimate the pedagogical aspects. Learning and training needs of firms should be in focus when designing and implementing e-learning.

3.4. Current available e-learning tools

E-learning tools available span from self-paced asynchronous tools to synchronous teacher facilitated or teacher led tools. Starting with the asynchronous tools, *CBT* are typically self-paced and CD-ROM based, where learners follow instructions embedded in the tools and interacts with texts, graphics and other features like audio, video, animation and application simulations. *WBT* use intranets, extranets and Internet to distribute the content. Limitations in bandwidth affect the sophistication of simulations, video, sound and graphics. Typical *Web lectures* are PowerPoint presentations, with or with out audio, similar to what teachers and other lectures present in lectures and classes. *Web books* are digital versions of books, and may include an advanced index function. Finally, *Electronic Performance Support Systems*

(EPSS) are helper applications used to exemplify the use of different features of the e-learning programme, or other programmes for that sake. Instead of presenting in text, a short animation or similar can exemplify content (MacEke, 2000).

Examples of teacher-facilitated methods are *discussion threads*, *virtual note boards* and *e-mail*. Learner can interact with each other and with the teacher, but not in real-time. *Virtual classrooms, virtual blackboards* or other *shared applications* provide the opportunity for teacher and learners to communicate in real-time. Here the teacher can give supervision to the learners as they carry out tasks and learners can interact with each other in *chats*, through *online voice and video* functions. The latter are examples of synchronous teacher led methods (MacEke, 2000).

3.5. Development, design and implementation of e-learning

The e-learning business is positive when presenting the possibilities and benefits of e-learning contra other means of learning and training. "Exponential growth is projected for e-learning as Web-based training replaces traditional instructor-lead corporate training" (*Chemical Market Reporter,* 2001) is one of several examples. Nevertheless, many e-learning initiatives do not live up to expectations (e.g. Hamid, 2002). The reasons for this can be found in the design, development and implementations of e-learning in addition to limitations of e-learning it self. The design of programmes might be to general treating all learners as equal leaving little room for individual differences in prior knowledge, learning styles, etc (e.g. Martinez, 2001).

There are several pitfalls when implementing e-learning programmes. Most sincere is ignoring implementation issues as a whole considering the job done when the programming of the programme is finished and the programme is ready for launching. The Electronic education system model (EES model) is one model describes issues to consider when designing, maintaining and implementing e-learning (Cloete, 2001). It includes technical aspects, type of e-learning (synchronous or asynchronous), pedagogical methods and communication tools and evaluation methods (formative or summative). Unfortunately, the model is a tool for planning e-learning and do not address the implementation of e-learning in an organisation context.

3.6. Summing up

We found that e-learning is technology-based learning (TBL). TBL differ from traditional learning by including a high degree of technology. In e-learning, the individual interacts with the technology or through the technology.

Where e-learning mostly is flexible when it comes to time and place, traditional learning is more flexible in content. Based on the feedback, it is easier for the teacher to adapt and adjust the content and pedagogical means to the learners, whereas e-learning programmes typically are more set once developed and designed. Developing e-learning programmes are more expensive than developing classes and courses. E-learning programmes are easy to distribute and deliver to learners with incremental costs once developed and designed. Traditional learning is cheap to develop, but expensive to deliver due to limited class sizes and teacher availability.

The amount of literature concerning e-learning and conduction of successful e-learning are overwhelming. Still, articles and studies often bases upon general assumptions and experiences, not structurally organised and collected empirical documentation as in experiments, comparative studies etc. Too often the focus has been on the technology instead of using the technology to develop, design and implement pedagogically profound e-learning (e.g. Govindasamy, 2002). One reason for this is the relative recent emergence of the e-learning technologies for education and training in firms. That is, the emergence of e-learning technologies is not recent, it started out as early as in the 50is, the widespread use of e-learning for firm learning and training is.

The maturation of e-learning technologies will put new strains on quality of the products and increase the interest for understanding why it works, documenting effects, and on how to conduct successful e-learning. By including an empirical case study, we aim to contribute in bringing the gap between e-learning in theory and e-learning in practice closer. We believe that the Organisational learning model might be helpful when implementing e- learning into a competitive firm context. The model bases upon the literature concerning organisational learning and individual learning. We wish to test the relevance and significance of the model by turning to our empirical case and explore the implementation of e-learning in practice in a competitive firm context.

4. Empirical Approaches: E-learning in Practice

4.1 Introduction

4.1.1. Objectives of the case study

Our objective of the case study is to explore e-learning in practice. More specifically, we focus on the use of e-learning as a tool for knowledge sharing and organisational learning in a competitive firm context. We aim to contribute to the understanding of how to implement successful e-learning.

The research question for the case study is: "how is e-learning implemented in a competitive firm context, and what are the critical factors for successful e-learning"?

We answer the aforementioned question by observing the implementation of an e-learning programme developed, customised and used by a firm in a competitive environment. The programme aims to increase frontline employees' knowledge of firm values. We departure from our Organisational learning model, and describe the design and implementation of the e-learning programme according to the variables included in the model. Then we explore the outcome of the e-learning programme and evaluate the variables in the model according to the empirical findings. Finally, we sum up the critical values for successful implementation of e-learning and discuss the possible consequences of our empirical study from the perspective of a wider audience.

Our model is a result of our theoretical inquiry. It includes features of the learning object, the organisation implementing the learning object, and suggests factors that

might influence the outcome of organisational learning. There are three factors included in the learning object box, i.e. *content, design* and *carrier*, which we turn to when we describe the programme. Implementation issues are our main concern and we will evaluate the factors concerning the organisation trying to learn. The *organisation support* factor concerns the organisation and the e-learning context of the firm including *presentation* of the e-learning, *access* in terms of time and technology, *incentives* for learners to complete the programme, *safety* in terms of anonymity and *assistance* available for the learners. The individual learner factor consists of *cognitive*, *affective*, *conation*, *social* and *learning history* variables.

4.1.2. Presentation of the case study

Expert Norway

Expert Norway (Expert Norge AS) is partly a wholesale merchant of consumer electronics and a retailer with own shops. It is one of the larger and market leading chains within its field in Norway. The brand "Expert" is well known in Norway through widespread use of adverts in papers and commercials on TV. In total, 208 shops are associated with Expert Norway. Local shopkeepers own 174 shops, the chain own the remaining 34 shops. The shops are organised into two different concepts, *Expert* (191) and *Expert Bonus* (17). Expert Bonus shops are located in cities and urban areas focusing upon large volumes, low prices and self-service (*ibid*.).

Expert Norway aims to be the most profitable and customer oriented integrated retailer of consumer electronics in Norway by the 31st of December 2003. By the time of the e-learning project, Expert Norway had two slogans: "The customer loves us and comes again and again!" and "We shall simplify shop intern work!"[4]. The values attached to the brand "Expert" reflect the focus upon customer orientation and efficiency. The values of Expert Norway are:

Customer orientation. Customers experience attention!

Credibility. The customers trust us!

Salesmanship. Good deals for all parts!

Simplicity. We do the everyday life simpler!

Efficiency. We act instead of talking!

Team spirit. We are dependent of each other, but take initiative!

After mixed results with previous learning systems (see Brøgger, *et al*., 2001), the executives of Expert Norway decided to try e-learning. They were keen on using e-learning as a mean for reaching all sales personnel in more effective way. They chose Involve AS to become their e-learning provider.

[4] All the slogans and values of Expert are in Norwegian and translated into English by us in the present paper. The questionnaire presented the participants was in Norwegian. We have translated it into English for the present paper.

Involve AS

Involve AS is an e-learning firm with approximately 50 employees working situated in Oslo and Stockholm. Most employees have a background in pedagogy, design or programming. The business concept of Involve AS is to deliver innovative, custom-made and interactive e-learning programmes, and to be the e-learning partner of large organisations. The vision of Involve AS is: "To transform business by involving all the people". Since 1994, Involve AS has delivered over 400 custom made e-learning productions with the focus on softskills. Whereas hardskills refers to skills needed for operating technological artefacts, like word processors or aeroplanes, softskills are about social, emotional and relational skills. Training courses for knowledge management, interpersonal and leadership skills, communication strategy and brand building are all examples of softskills productions (www.involve.com).

Expert on a day

The executives in Expert Norway wish to increase the capacity and knowledge of the organisational values among the employees associated to Expert Norway. The executives believe in the values of Expert Norway and want the values to become a *theory of action* for the firm. The executives believe the employees' endorsement of the values in their choices of action will inflict upon the sale performance of the employees, and thereby the performance of the organisation in term of increased market shares. A vehicle to help them reach this goal is the customised e-learning programme "Expert på en dag" (i.e. Expert on a day) developed by Involve AS. The target group consist of all employees, part-time and full-time, working in Expert Norway.

"Expert on a day" consists of two parts including selected chapters of the operation handbook of Expert and an interactive programme to help the employees become familiar with the content and use of the handbook. Further, the programme is developed to enhance knowledge and understanding of the values connected to the brand "Expert". The use of e-learning for knowledge sharing and organisational learning is of our concern. We will focus on the use of the interactive e-learning programme for diffusing the values of Expert Norway throughout the organisation to the frontline employees.

4.1.3. Methodology of the case study

Method

The use of e-learning in a competitive firm context is a new phenomenon. We find it necessary to observe from different perspectives to be able to cover the richness of the field due to the lack of structured and controlled studies. Our case study is an *instrumental case* study, according to Stake (1994) categorisation. It is *multi-methodological* in its approach.

Procedure and participants

We gathered the empirical data through semi-structured interviews with the project manager and a senior advisor in Involve AS, and the project managers in Expert Norway. We participated as active observes in meetings with Involve AS and Expert Norway. The interview questions are appended in Appendix A.

We interviewed five learners and seven head of shops of Expert shops (Appendix B). Due to time and budget limitations, we interviewed employees in shops located in the eastern part of Norway. To secure representability, we selected the shops for interviews according to type (Expert or Expert Bonus), location (rural or urban) and ownership (owned by Expert Norway or local owner). Table 2 shows the distribution of the interviewees and their position.

Table 2. Distribution of interview objects according to selected characteristics

Position	*Type of shop*		*Location*		*Ownership*	
	Expert	Expert Bonus	Urban	Rural	Expert Norway	Local shop owner
Head of shop ($N = 5$)	3	2	2	3	3	2
Employees ($N = 7$)*	6	1	1	6	2	5

* Six sales persons, one head of department

We also prepared a survey directed towards learners[5], which was embedded in the e-learning programme. The survey included question concerning background information and learners' appraisals of the programme. The items concerning the background information were part of the logon process of the programme, the appraisal items were presented the learners at the end of the programme (Appendix C). The learners could choose between five options ranging from "totally agree" to "totally disagree" on the items concerning appraisals. We also included data of selected learner (user) behaviour available from the embedded statistics of the e-learning programme and with our own observations of the programme.

In total, 175 of the 208 shops associated with Expert Norway participated in the e-learning project. Since our survey is part of the e-learning programme, this is also the number of shops participating in our study (Table 3).

Table 3. Participating shops according to ownership and type of shop

	Ownership	
Type of shop	Expert Norway	Local shop owner
Expert (*N* = 158)	15	143
Expert Bonus (*N* = 17)	17	
Total (N = 175)	*32*	*143*

Overall, 770 learners working in shops associated with Expert Norway participated in the survey. Table 4 lists the participants in the survey according to gender and position.

[5] The head of shops also accomplished the e-learning tool. We include them in the 'learners' category when we refer to the results from the survey and the statistics from the e-learning programme.

Table 4. Respondents in the survey according gender and position

Position	*Gender* Female	Male
Head of shop (*N* = 126)	19	107
Section leader (*N* = 147)	25	122
Salesperson (*N* = 357)	127	230
Storesman (*N* = 15)	-	15
Extra help (*N* = 67)	20	47
Other (*N* = 57	12	45
*Total (N = 769)**	*203*	*566*

* One is missing. The total number of respondents in the survey is 770.

Operationalisation

Observing variables in the Organisational learning model by studying the case of Expert Norway is our main concern. Figure 1 show the operationalisation of the variables in the Organisational learning model in addition to e-learning outcome variables and are explained in detail in the following paragraphs.

Table 5. Overview over factors, variables and measures of the case study

		Measure		
Factor	*Variable*	Interview, learners (question number)	Interview, head of shops (question number)	Survey (item number)
Individual learner	Cognitive	15, 16	13	6,7
	Affective	19, 20	15	
	Conation	17, 18		k
	Social	21, 22		
	Learning history	7		i, j
Organisational support	Presentation	1	1	9, 10
	Access	4, 5, 6	6, 7, 8	2, 11, 12
	Incentives		11	13, 14
	Safety		10	8
	Assistance	3	5, 9	3
E-learning outcome	Learner experience	28, 29, 30		19, 20
	Learning effect*	25, 26, 27	14	15, 16, 17, 18
	Firm feeling**	23		

* I addition, we measure the learning effect by including the statistics of learner behaviour embedded in the programme.

** In addition, we asked the project managers in Expert about the effect of the programme on firm feeling.

Individual learner factor

We measure the *cognitive* aspects by focusing on learners' assessment of the level of the content (question 14, 15) and the fit between the content and needs of the learners (question 16). We asked the head of shops about the relevance of the content for the work in the shop (question 13). Items 5 and 7 in the survey concern the fit between the skills needed to use the programme and the skills of learners. The questions about

feelings (question 19) and thoughts[6] (question 20) concerning the use of the programmes in the interviews with learners represents the *affective* variable. Question 15 in the interviews with the head of shops also represents this aspect. *Conation* includes several aspects; we focus on the motivation aspect. The interviews with learners includes questions concerning their motivation to complete the programme before using it (question 17), and if they found the programme motivating (question 18). In addition, we included one item (item k) concerning the learners' motivation for completing the e-learning programme. There are several ways to focus on the *social* aspects of the learning situation. We focus on the learners' experience of the learning situation (question 21) and to what extent they discussed the programme with others (question 22). The last variable in the individual learner factor is the *learning history* variable. One can argue that the learning history is part of the cognitive aspect, but we chose to keep this as a single variable. We were interested in the learners' previous experience with computer and computer programmes (question 7). We asked the learners about their level of education (item i), experience with computer and computer programmes (item j) in the survey.

Organisational support factor

Turning to the *organisation support* factor, we start with the *presentation* of the e-learning to the learners in the shops. In the interviews, we asked the learners (question 1, 2) and the head of shops (question 1) to describe the presentation of the e-learning in the shops. In addition, item 9 and 10 in the survey covers the presentation aspect. Question 4, 5 and 6 in the interviews with learners and question 6, 7 and 8 in the interviews with the head of shops covers *access* in terms of time and technology. Item

[6] One can discuss why we have included questions about thoughts in the affective variable, but often

2 and 12 in the survey covers access in terms of technology, and item 11 access in terms of time. Question 9 in the interviews with learners and question 11 in the interviews with head of shops covers *incentives* provided by the chain, the shop, and the learners' personal incentives. In the survey, item 13 and 14 focus on incentives. Question 8 in the interview with learners, question 10 in the interview with head of shops and item 8 in the survey concerns *safety*. Finally, question 3 in the interviews with the learners, question 5 and 9 in the interviews with head of shops and item 3 in the survey represents the *assistance* variable.

E-learning outcome

The e-learning outcome refers to

a) learners' appraisals of the *e-learning experience*. We collected the learners' appraisal of the e-learning experience through interviews (question 28, 30) and survey questions (item 19, 20).
b) *learning effect*, based upon the learners' self-appraisals, and measures of learning effect from the e-learning programme. We collected information about the learning effect in the interviews with the learners (question 25-27), head of shops (question 14) and in the survey (item 15-18). In addition, the e-learning programme included two identical exercises directed towards the recognition and identification of the firm values of Expert Norway. The learner completed the exercise first at the beginning of the programme and repeated it in the certification test at the end of the programme (picture 3). The difference between these scores serves as an additional measure of the learning effect.

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people answer questions about feelings with describing their thoughts and visa versa.

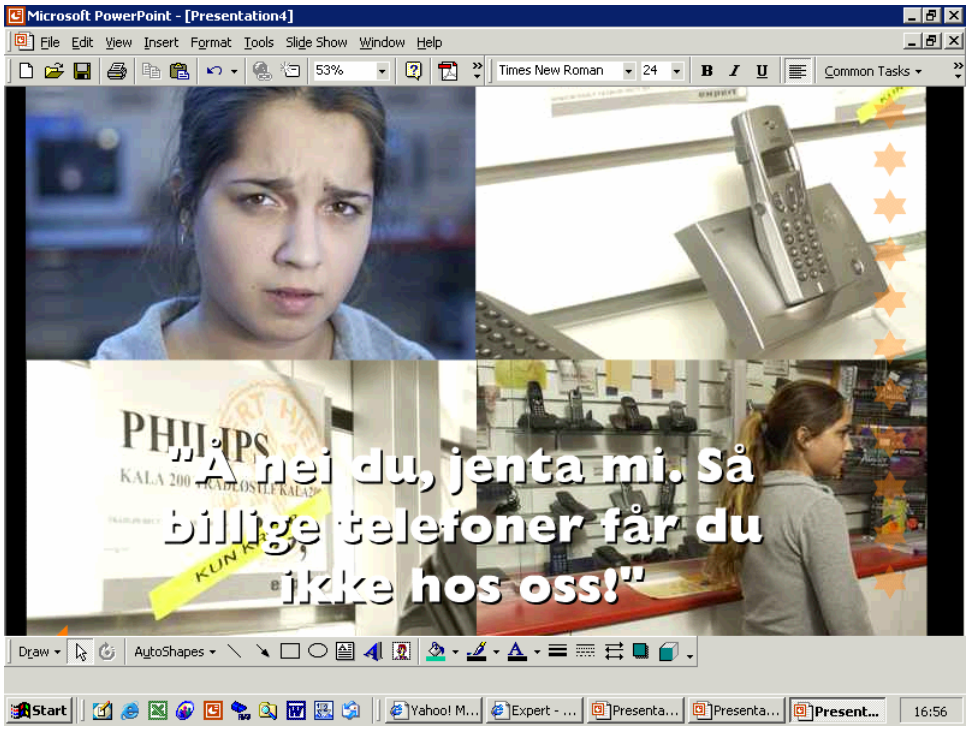
c) effects on learners' firm feeling; the feeling of being part of Expert Norway. We explored if the programme could contribute to the feeling of being part of Expert Norway. Question 23 in the learner interview aims at measuring this aspect.

Picture 3. Exercise "Identify the values" from the e-learning programme.

Statistics

We used SPSS for Windows, release 11.0.0, for conducting the statistical analysis, mainly parametric methods. The sophistication of the analyses ranged from descriptive statistics (frequencies and means) to paired samples t-test and analysis of regression, in addition to reliability analysis. All statistical results of the survey, significant as not significant results, are included in Appendix D.

We received only 22-25 responses on some of the items even though the total number of respondents was 770 due to problems with the logging function of the programme. The problem affected the items concerning the learners' appraisals of the e-learning experience and learning effect, presented the learners at the end of the e-learning programme. We will discuss this problem in grater detail under 4.3.3. The data problems inflicted upon the statistical analysis. We used analysis of regression despite of low numbers of responses. We treat the results in these cases as indicators rather than significant results, which is in line with our aim of exploration.



Picture 4. Screen print from the e-learning programme "Expert on a day".

4.2. The e-learning programme

In this section, we describe the e-learning programme used in our case study firm and show the relationship with the content, design, and carrier factors indicated in our Organisation learning model.

4.2.1. Content

The content of the e-learning programme consists of selected chapters from the operation handbook and an interactive part including information on corporate values and simulations of situations that touches upon these. The programme is a tool for reaching a common understanding of Expert Norway's values (i.e. knowledge), including how to act accordingly with these (i.e. skills), throughout the organisation.

4.2.2. Design

Physical appearance

The programme includes explicit elements like corporate values as well as more tacit elements. The colours, logo and pictures taken from the "Expert look" and Expert or Expert Bonus shops are tacit elements reconstructing the Expert context in the e-learning programme. One example is the digital operation handbook, which the learners access by clicking on a picture of the physical operation handbook (see picture 3). The learners go through the programme individually and accomplish it when they want at the pace they want. All learners go through the programme following the same sequence. The learners manoeuvre between the sequences by clicking on arrows appears when the learners have accomplished the tasks of the

page. The programme includes some elements of individual customisation. It is up to the learners to what extent they want to consult and read the operation handbook.

Learner computer communication is the main form of communication embedded in the programme. The programme is interactive in the sense that it calls for learner activity by including *attitude exercises, concept exercises* and *knowledge exercises*. The attitude exercises aims to make learners reflect upon their values and explore how the values inflict upon their behaviour in specific sale situations. Further, the programme asks the learners if they can recognise the values of Expert from a list of values (concept exercise). Finally, the programme asks the learners to recognise the content of each value (knowledge exercise). The programme also includes *simulations* of real-life situations in the shop using pictures and sounds in telling the story. The programme asks the learners to pick the option of action coinciding with the values of Expert in connection to the story. In the end of the programme, the learners have to go through a *certification test*. If they pass it, they have become "Experts in a day".

Pedagogical means and measures

Embedded in the programme are *pedagogical means* and considerations reconstructing the classroom or learning situation in addition to the learning content. *Interaction* and *learner activity* seems to be keywords when it comes to e-learning technologies. The programme starts by picturing the goal instead of telling this explicit to trig the imagination of the learner. Further, the exercises and questions demand a high degree of learner activity, and the learners receive immediate *feedback* on how they are doing directly. According to one interviewee from Involve AS, "one must acknowledge what is right so we do not get the users against us". One way to do

this is to create and design exercises and give feedback that gives a sense of *coping* by the learners.

> "Motivation is important, to try to appeal to inner motivation by making exiting, dramatic and relevant programmes with situations they (learners) can recognise."

The programme includes incentives appealing to the *external motivation* of learners for completing the programme. The learners have the possibility to join a lottery where they can choose among several prizes after completion. To join it, the learners have to pass a certification test and register on a web site. As the learners go through the programme, they are encouraged to collect "stars". Each star will give them one minute of study time to prepare for the test. The programme appeals to *inner motivation* of learners by evoking feelings and the curiosity of the learners. The programme seeks to be close to reality simulating real-life situations in which the learner can *recognise*. Since the focus of the programme is on sale skills, it includes simulations of possible sale situations where the learners must take stand to what they normally would do. They can consult the operation handbook and compare their choice of action to the action that is in line with the particular organisational value illuminated upon in the simulation. The programme makes the learners reflect upon their own choices of action leading the ground for change of action.

> "One can learn models; get ideas, which one can test later in practice. E-learning can start a process of thought around these issues. There is a large difference between e-learning and reading a book. E-learning carries a larger potential for presenting ideas for actions to different situations, but the actions must be tried out in practice."

4.2.3 Carrier

Most of the e-learning programme is made in Flash code, except for some parts like the logon sequence, which is made in HTML (Hypertext Mark-up Language). Flash is a programming language used for making navigation functions, animations, introductions and web sites rich of illustrations. Flash uses vector graphics, which makes it bite efficient. HTML is a programming language used to define content and layout of web pages. The behaviour and answers in the e-learning programme are logged in a database and accessible by using an advanced log solution, SQL (Structured query language). SQL is a database programming language used for adding and subtracting data from a database, which works on most acknowledged platforms and server systems. The log data are accessible by the project managers in Expert Norway.

The e-learning programme relates to the SCORM and AICC standards for e-learning. It is designed for Involve Learning Management System (iLMS), developed by Involve AS. The iLMS is not required for running the e-learning programme and the programme functions as a separate unit. The programme is asynchronous, Web-based, located on the Expert server and accessible through Extranet.

The technology of the organisation using e-learning must satisfy a minimum set of technological specifications for the programme to function satisfactory. These specifications include claims concerning hardware, software and connection compatibility. The computers must contain minimum a Pentium 233 MMX or Pentium II 300 MHz without MMX, and 32 MB RAM. They must have a 16 bit sound card including speakers or headphones. The screen size must be 800 x 600 with

65 000 colours. The programme is developed for Windows 95 or higher operating system and demands Internet Explorer 4.0 or higher or Netscape 4.0 or higher browser with Shockwave 8.0, Flash 4, Quicktime 4 and Realplayer 7 plugins. Further, the computers must have minimum a single channel ISDN (64kbs) Internet, intranet, or extranet connection.

4.3. Implementation

This section provides a short description of the organisation of the implementation into the chain and into the shops.

4.3.1. Implementation into the chain

The first time the head of shops heard about the e-learning project was at a general meeting in the spring 2002. The head of Expert Norway talked in favour of the e-learning project. The project manager among others involved in the project from Involve AS presented the programme, provided information about where to find it, how to use it, technological claims and showed it on a big screen. Later, the shops received mouse pads with logos on them, study plans for booking time on the computer and cards providing the vital information about the project some time before the launching of the programme on Extranet.

The head of the shop also received three e-mails in connection with the project, all signed by the central executive of Expert Norway. The first included some information on the e-learning project, the second was sent out in the beginning of the implementation stating that the 50 shops started using the e-learning programme was

doing well. The last one was out in a more strict tone saying that the shops now should start using the programme. The final deadline of the project was 31st of August 2002. By then all employees should have completed the e-learning programme.

The head of the shops (N = 5) differed in their appraisal of the presentation and the organisation of the project from Expert Norway centrally. One head of shop described the presentation this way:

> "It was presented in several turns. We got a presentation, a taste of it in Oslo Plaza in a meeting. It is also an introduction to it on the Extranet and we have received several e-mails. I think the talk started last autumn. This is the last "training" year. Next year we shall be the best in our branch.

Others reported that they did not receive that extensive presentation (2)[7]. They described that they got the information only through e-mail or saw it on the Extranet.

> "I got instructions via e-mail. They did not include any information about intention. They set a deadline, which we have to hold. The information given to us was lacking."

There seemed to be a division between those who attended the general meeting at Oslo Plaza and those who did not, the former receiving sufficient information, the latter receiving insufficient information about the project.

[7] The numbers in brackets, e.g. (2), refers to the numbers of learners replaying with the same or similar responses, while e.g. (N = 5) refers to the total numbers of learners responding to the question or item.

4.3.2. Implementation into the shops

Individual learner factor

Cognitive

We did not include a complete assessment of the cognitive abilities of the learners. It would be out of the scope of this study. Overall, the result of our study includes issues concerning a) the level of the content, b) the difficulty of the programme and c) the degree it suited to the learning needs of the learners. In addition, in the end of this section we include a discussion regarding the role of learning history, i.e. experience with computers, level of education and working experience.

a) In the interview concerning the level of the content, the learners (N = 7) replied that there were some new aspects (4), much functioned as repetition (5) and it was neither too hard nor easy (4). One added, "I learned something about Expert and what they stand for". The head of shops (N = 5) mostly replied that they found the content relevant and useful. One put it this way:

> "It was useful since there have been many changes in Expert Norway. They show interest in the shops, they care."

In the survey, we asked if the learners understood the instructions in the programme. The majority of the learners responded that they "partly agree" (16%) or "totally agree" (76%) to the statement that they understood the instructions in the programme (N = 25).

b) The majority of the learners replied that they "totally agree" (84%) to the statement in the survey that it was easy to use the e-learning programme (N =25). This was

confirmed in the interviews (N = 7) where most learners (5) replied that it was easy or OK to accomplish the exercises in the programme.

c) When it comes to customisation of the programme to personal learning needs, the answers where disperse (N = 6). The answers diverted ranged from "I did not need it" (2) to "Yes, it suited my needs" (4).

Affective

Having in mind that experiences evoking feelings are more easily remembered, many learners (N = 7) reported that the programme was fun to use (3) or otherwise spoke about it in a positive manner (4). When asking more specific about what feelings the programme evoke in the learners (N = 6), the replies were somehow sparse. The most common replay was that it did not evoke negative feelings (3), only positive feelings (3). The head of shops described mostly positive reactions from the learners on the programme and that they liked it (2), and that it was OK (2).

Conation

We asked the learners to rate how important it was for them to go through the e-learning programme. The majority of the learners agreed to the statement in the survey that it was "important" (52%) or "very important" (25%) to go through the e-learning programme (N = 770). In addition, the interviews with the learners (N = 7) confirms this. All respondents replied one way or another that they were motivated (7) to use the programme. The most negative comment was that it was OK (1). When it comes to how the programme itself inflicted upon motivation (N = 7), the learners

found the programme OK (2), engaging (1), not boring (1) and that time passed quickly (1).

Social

The evaluation of the social aspects of the learning experience was diverse. Many pointed out some of the pros and cons listed in table 1. Almost all of the interviewed learners (N = 7) found it somehow lonely (5), but still thought it was OK (7). One reported that an advantage was that one is not disturbed, others that they are used to sit and work with computers (3). We also were interested if the learners discussed the programme with colleges (N = 7). Unexpectedly, few (2) had discussed it. One reason for this is that they had just recently accomplished the programme at the time of the interviews (1) and they did not have time for discussing the programme (3). Of the latter group, two responded that they probably would discuss it when they have time.

Learning history

The learners were a diverse group when it comes to IT experience and education. Figure 2 and 3 shows the distribution of the participants on these variables. The average learner (N = 752) had worked 5.9 years in Expert. In the interviews (N = 7), the majority (6) of the learners claimed that they had enough prior knowledge of computer and computer programmes to run the programme and one managed it with help. We have already touched upon the level of the content in the programme when discussing the cognitive variable. All of the learners interviewed (N = 7) found that they had sufficient knowledge about the content to accomplish the programme.

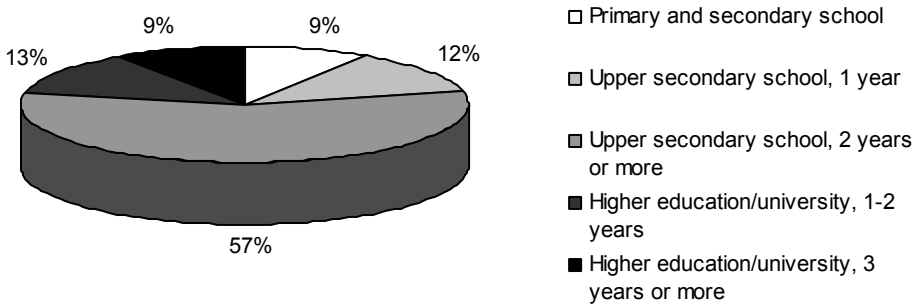


Figure 2. Learners level of education (N = 770).

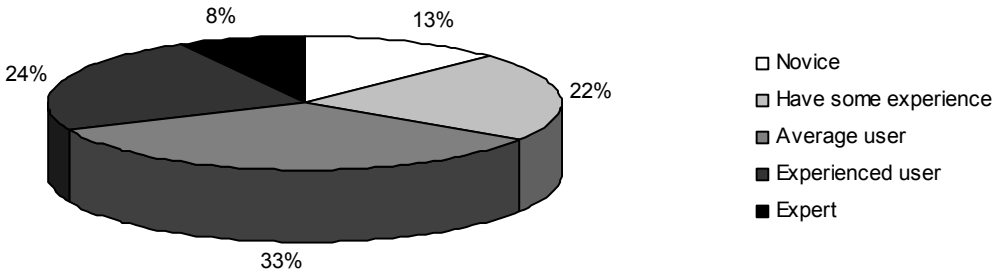


Figure 3. Learners IT experience (N = 770).

Organisational support factor

Presentation

Mostly, the head of shops (N = 5) presented the e-learning project in the shops (4). The head of shops differed in their presentation of the project into the shops and seems connected to the information they received themselves. One interviewee puts it this way:

> "As the head of shop, I accomplished the programme myself first and took the certificate in advance. I brought it up on several meeting stating that e-mail is coming. I also used a PC in the shop and went through it with the whole group. Everybody has seen it by now."

On the other extreme a head of shop, which also pointed out that the information from Expert Norway was lacking, describes:

> "I put forward what I had been presented to the employees at a meeting. It is an exam, one do not learn anything new".

The second case seems to be an exception. Interesting though is the fact that in this case, the employees received copies of the operation handbook to read in advance of going through the e-learning programme. It is still a learning situation, but differs in the sense that the learners approached the programme expecting an examination instead of an interactive learning situation.

The learners' evaluations (N = 7) coincided with the head of shops. Around half of them described an introduction that was satisfying (4) whereas the other half knew little about it before they accomplished the e-learning programme (3). In the survey (N = 22), most of the learners agreed totally to the statements that they were informed about the content and goal of the e-learning programme (41%) and that their workplace priorities the e-learning programme (64%)

Access

We focused on two types of access: time and technological access. All shops had access to computers and Extranet connections. In the survey (N = 22-25) , most of the learners agreed totally to the statements that it was easy to gain access to a computer (82%) and the computer had no problems running the programme (76%). The interviews with the learners (N = 7) confirmed this. Only one learner interviewed reported problems and was disconnected several times from the Net. In addition, three learners reported that they accomplished the programme without the sound features. When the head of shops (N = 5) are asked whether they had any problems with the technology, they responded that they had to upgrade their browser, but they had to do it anyway.

When it comes to access in terms of time, the majority of the learners in the survey (N = 22) reported that they "partly agree" (9%) or "totally agree" (82%) to the statements that the shop provided them with the time to accomplish the programme. Only 9% reported that they "partly disagree" to this statement. The interviews confirms this picture (N = 7). One learner reported that he spent less time than ideally since he took it during opening ours. Another chose to accomplish it from home.

> "I took it on my own initiative at home. It is more peaceful there and no problem to find the time for it"

Three of the head of shops (N = 5) reported problems for learners to accomplish the programme during opening hours. Customers or fellow workers interrupted them. When first interrupted, the learners had to start the programme all over again. One head of shop solved this problem by organising the learning outside opening hours.

Incentives

Expert Norway included the possibility for the learners to join a lottery after completing the e-learning programme. In addition, some shops put up their own incentives for completing the programme, like wine or extra payment if they took it outside opening hours. All these are incentives being part of the learners' external motivation. These probably played a certain role, but according to learners (N = 7) and head of shops (N = 5), the internal motivation were more important. The fact that some learners chose to take it on their spare time at home confirms this. Several learners pointed out that it was interesting in it self and stimulating to use the programme (4). As one learner put it:

> "I did not think about the competition in the end of the programme. It was just an extra puff. It was fun, a kick for me to answer with the alternatives. Almost all of them could be right. I had to think thoroughly."

Some head of shops (2) pointed that everybody likes to learn and that it might be important fore some learners to pass the certification test in the programme (1). One statement in the survey directed aspects of internal motivation. In the survey (N = 22) the majority of the learners "agreed partly" (18%) or "totally" (59%) that the accomplishment of the programme was important for their career. The majority disagreed partly (36%) or totally (41%) to the statement that the shop rewarded them for accomplishing the programme.

Safety

We got the impression that it did not matter if others could find out what they answered and how they did. For example, three of seven learners interviewed said that it did not matter. In the survey (N = 22) the statement "my boss will not know what I have answered" aimed to measure safety. Above half of the respondents "agreed partly" (9%) or "totally" (55%) while 14% "disagreed partly" and 5% "totally disagreed" to this statement.

Assistance

Unexpectedly, the need for assistance seemed not to be an important issue for the head of the shops (N = 5). Except for one who received help when asking, it seems not to be an issue. As one interviewee puts it:

> "There was no need for support, it was not mentioned in the programme or on extranet".

The learners did not mention support as an issue in the interviews (N = 7). In the survey (N = 25), the majority of the learners "agreed partly" (16%) or "totally" (76%) to the statement that they could go through the programme without the help of others.

4.3.3. Additional findings: Implementation problems

There were problems with the logging function of the programme. At the beginning of the project, the project managers in Expert could not see how many learners had passed or failed the certification test. Many learners did mistakes like logging in under somewhat different names, checked of that it was the first time they logged on even though they previously had been logged on to the programme.

The logging problems also affected our study since the survey questions were part of the programme. On the positive side, all learners had to reply to the questions and items to proceed in the programme and were thereby included in our study. This was only partly true for our study. We received approximately all data connected to the background information, which was part of the logon process for the programme. There were more problems connected to the responses on the later part of the survey concerning learner appraisals. These items were presented to the learners on three subsequent pages at the end of the programme.

The data we received followed a pattern. The documentation included either all responses from the same page or no responses. When discussing this finding with Involve AS, we found that this was probably due to communication problems between SQL and Flash. HTML communicates better with SQL than FLASH and Flash is more vulnerable to communication problems like modem connection speed and server problems. In the Flash sequences, the programme sends the requested data when the learner does a specified action. In our case, it was clicking on an arrow appearing in the lower right corner when they had responded to all the questions on the page. They had to click it to continue in the programme. The problem was that the programme could proceed even if there were problems with storing the data from responses in the database.

According to the programmer involved in the project from Involve AS, there are several possible solutions to this problem when designing e-learning programmes. First, it is possible to make sequences where logging is important in HTML. Due to

the limitations of HTML, this is not a satisfactory solution if for example graphics and visual expression are important. Second, one can force the programme to await feedback from the database that the data is stored before the programme continues. When it comes to implementation, extensive testing before launching the programme, close monitoring and user assistance the first days or weeks would help detecting and correcting errors and malfunctions in the programme. The project managers in Expert Norway came with suggestions in the same line. The time before launching the programme was very hectic. If they had used more time with testing, it would be no problems to detect and correct several of the errors before the learners started to use the programme.

The project managers commented the timing of the project. It might have been better to accomplish the project in for example three weeks rather than over several months and try to avoid the holidays (the e-learning project coincided with the summer holiday). Because of the long time limit, many shops tended to forget the project and completed it near the end of the project. An additional problem was the changes of project managers in Expert Norway. Due to turnover, three employees had this as their responsibility. A project manager in Expert Norway reported that she lacked sufficient information when she received the responsibility of the project.

4.4. E-learning outcome

The learning goal of the e-learning programme is to increase the learners' knowledge of the organisational values and to help them act according to these when meeting the customers. With e-learning outcome, we refer to a) the outcome in terms of learner experiences, b) the learning effect of the programme and c) the feeling of being part of Expert Norway. We start with presenting the learners' appraisals of e-learning experience.

4.4.1. The outcome in terms of learner experiences

The learners (N = 7) mentioned several pros and cons of e-learning and traditional learning. Starting with the pros of e-learning, the time aspect was important. E-learning is more efficient (2) and flexible (2) when it comes to the time aspect. The learners can decide when to take it (1) and continue when they want to if they are disrupted (1). E-learning is also more flexible when it comes to place (2). As on learners stated: "you do not have to go out of the shop leaving more work to the others". E-learning is a good (2) and efficient way of learning (2). It is fun (2), easy (1) and demands few resources. One learner formulated it like this:

> "E-learning saves time, is more efficient and more fun than listening to people for 2-3 hours. It is more efficient for me and more fun than reading a book."

The social aspect of e-learning was the most common mentioned disadvantage of e-learning. Courses are more social (4) useful to exchange experiences with learners from other shops:

> "It is not possible to discuss different solutions and views with others, especially exchange experiences with others form other shops."

As some learners claimed that e-learning was more efficient, some learners claimed that courses are more efficient (2). Likewise, some learners preferred to listen to other talking (1) finding that more relaxing (1). One learner emphasised the change aspect (1) appreciating the change of getting away from the workplace.

The head of shops (N = 5) mentioned some of the same pros and cons but put more emphasise on the economical aspects. The social aspects were also mentioned as the negative side of e-learning (3) lacking the opportunity to meet others with differing experiences and discussing with others. When is comes to the experiences with lecturers, this seem to be divergent. One emphasise that it can be good to get impulses from other branches whereas others (2) are critical to bring in lecturers, which have never worked in shops. Some (2) mention that a combination between e-learning and traditional learning might be preferable:

> "The social aspects are lacking unless several are gathered and go through the e-learning at the same time. They are more alone, the social part is missing, less discussion. The costs of sending people away are enormous. They have to be replaced by others while they are away. A combination is best."

The head of shops pinpointed that e-learning programmes are not as flexible as traditional learning. Questions must be formulated in a way understandable for all learners, since no teacher present to explain and correct misunderstandings.

Most learners were positive to e-learning in the survey. When asked if they would like use similar training programmes again (N = 54), over half of the learners "agree totally" to this (Table 6) When confronted with the statement "I prefer traditional training like, teaching, courses and seminars before e-learning programmes like this one", the picture is somewhat different (N = 54). Here the most common response was that the "both agree and disagree" (44%) and "agree fully" (30%) to this statement (Table 6).

4.4.2. The learning effect of the programme

The learners (N = 7) were asked to evaluate their learning. All but one reported that they had learned by using the programme. The responses reached from "some" (2) via "yes" (3) to "much" (1). The learner reporting that no learning had occurred responded that it was repetition. Some of the learners commented what they had learned; most (3) addressing customer orientation. One learner put it this way:

> "Yes, most important is maintaining a high level of service. I learned about the campaigns and how to meet the customers".

In general, all learners (N = 7) find the content useful and relevant for their work. When asked if they think it will inflict upon their work practice, they replied either that it confirms what they al ready do (3), or they that it might change their practice to a certain degree (4):

> "I think I am a little bit more humble towards the customers".

We asked the head of shops (N = 4) about the effects of the programme. All stated that they think it will have effect and lead to changes. Some mentioned conditions for this. Time and availability is important (1) and training must be continuous to meet all the changes (1).

Several items in the survey concern learning outcome. Item 15 and 16 focuses upon the knowledge aspect, i.e. learning of firm values of Expert and content of the operation handbook of Expert. Item 17 covers the learning of skills of using the digital operation handbook. Item 18 covers the effects of the programme on work practice. The learners' appraisals of learning effects were positive on all the items (Table 6).

The learners completed an exercise at the beginning of the programme where the task was to recognise and identify the six Expert values out of a list of ten possible values. The learners repeated the exercise at the end of the programme in the certification test. The difference between these scores indicates immediate learning effects of the programme. The learners got their score, maximum six, according to the number of correct values recognised. The average score in the first exercise was relatively high (M = 4.90, SD = 1.54, N = 490), indicate a high degree of knowledge of firm values among the learners leaving less room for improvement. Still, the average on the second exercise was even higher (M = 5.44, SD = 1.14, N = 451) indicating a positive learning effect. The learning effect were significant ($t(390) = 6.36$, $p < .001$).

There are several limitations attached to this effect measure. First, it captures immediate, short-term not long-term learning effects. Second, it represents only one, i.e. knowledge of organisational values, of several learning goals in the programme. Third, it captures performance in a training environment, not in work practice. Finally, learning is a complex phenomenon. Recognition of facts is a relatively simple task not representative for all types of learning. Still, the strength of this effect measure is that it compares the knowledge of the learners before and after completing the e-learning programme.

Table 6. Learner appraisals of e-learning outcome reported in the survey

	Options N, (%)				
Survey item	Totally agree	Partly agree	Both	Partly disagree	Totally disagree
E-learning experience					
19. I would like use similar training programmes again (*N* = 54)	31 (57%)	9 (17%)	13 (24%)	1 (2%)	-
20. I prefer traditional training like courses and seminars before programmes like this one (*N* = 54)	16 (30%)	4 (7%)	25 (46%)	8 (15%)	1 (2%)
Learning effect					
15. The e-learning programme has helped me learn the values of Expert (*N* = 54)	39 (72%)	11 (20%)	3 (6%)	1 (2%)	-
16. I have become familiar with chapter 1,5,7 and 9 in the operational handbook through the e-learning programme (*N* = 54)	25 (46%)	17 (32%)	10 (19%)	2 (4%)	-
17. I have learned to use the operation handbook (*N* = 54)	30 (56%)	14 (26%)	6 (11%)	2 (4%)	2 (4%)
18. I will do a better job after accomplishing the e-learning programme (*N* = 54)	25 (46%)	13 (24%)	13 (24%)	2 (4%)	1 (2%)

4.4.3. Learning outcome, firm feeling

Finally, we asked the learners (N = 7) if the programme affected their feelings of being a part of Expert. Feelings of belonging and unity are important aspects connected to individual performance and thereby organisations (e.g. Meyer, Stanley, Herscovitch & Topolnytsky, 2002). The learners' responses diverted (N = 7). Many already felt part of Expert Norway (4). Some though the programme could contribute to and strengthen their feelings (4), whereas others did not think the programme would inflict upon this (3). One learner put it like this:

> "I work in Expert and the programme can contribute to the feeling of working in Expert."

The project managers in Expert Norway reported that they believed that the e-learning project reached employees that normally receive little information about what is going on in the Expert Norway. Normally, the same employees go to exhibitions, meetings and seminars, leaving the rest dependent on receiving information from the ones attending. Through this project, the project managers believe that it inflicts upon the employees' feeling of being part of Expert Norway.

4.5. Critical issues

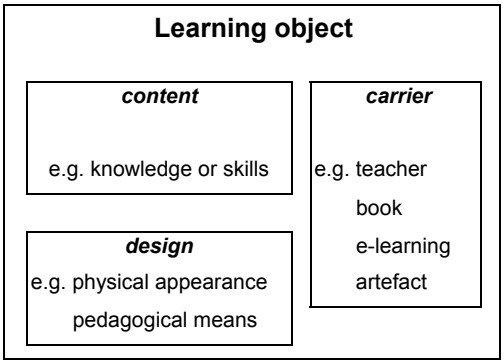
In this section, we focus on the relationship between the implementation of the e-learning programme and both the organisation support and individual learner factors stated in our Organisation learning model. As mentioned above, we refer to e-learning outcome as a) the outcome in terms of learner experiences, b) the learning effect of the programme, and c) the feeling of being part of Expert Norway.

The statistical analysis bases upon the learners' appraisals and the scores on the value exercises embedded in the e-learning programme. We combine the variables concerning the learners' appraisals of learning effect (item 15-18) from the survey to simplify the statistical analysis. The reliability between these items were considerably high (Alpha = .81, N = 54), which was not the case between the items (19, 20) concerning the learners' appraisal of e-learning experience (Alpha = .10, N = 54). Instead, we used item 19 in the survey to represent the learners' evaluation of the e-learning experience. The feeling of being part of Expert was not included in our survey and thereby not included in the statistical analysis.

The statistical analysis is limited, due to the problems with storing the learner responses in the database and the relatively low numbers of responses on variables concerning the appraisals of the learners. This is an interesting result, which unfortunately inflicted upon the sophistication of the statistical analysis of this study. Our plan was to test the Organisational learning model and the role of the organisational support and individual learner factors statistically, but had to settle with a discussion of the variables and their relation to e-learning outcome. Table 7 summarises the critical issues emerging from the Organisational learning model, the additional issues are summarised in Table 8.

4.5.1. Learning object

Starting with the features of the carrier, several critical issues emerged in the interviews with the e-learning firm. First, one key feature of e-learning seems to be the high degree of *learner activity*:



> "Let people try themselves. Plan according to what they shall do, not hear or see. Interaction is the keyword, interaction with the programme, with others and with oneself. One must limit the theoretical parts and focus on action to bring up the right thoughts. E-learning does not replace reality, but is an advanced way of presenting theory".

In our case, the e-learning programme included many exercises concerning the firm values (i.e. knowledge) and how to act according to these (i.e. skills). The programme *simulates* situations in the shop as well as the teacher learner relationship. The feedback on the exercises reflects the latter. One can say that the e-learning programme reconstructs contexts and tacit elements as well as including explicit elements like information on firm values. A common assertion in the literature is that tacit elements of knowledge are harder to transfer than explicit elements. The e-learning programme uses relatively simple means such as graphics, pictures and short stories, to simulate tacit and contextual elements. The means are simple in the sense that they do not put excessive demand on hardware, software and bandwidth capacity. Simplifications are necessary for pedagogical reasons and technological reasons. First, it removes non-significant decisions emphasising the decisions that enhance understanding. In that sense, efficient e-learning *simplifies* not copies reality and is a

result of a selection process, emphasising the most relevant information. In addition, simplification is necessary due to technological considerations.

In sum, successful e-learning manage to construct a learning situation and simulate situations that learners *recognise* and find relevant. As mentioned before, most learners and head of shops found the situations and exercises credible and relevant for their work practice. The programme must be motivating to use. One mean to secure this, is to provide the learners with a sense of *coping*. The e-learning firm describes it like this:

> "We must take care of what is right, acknowledge what is right so we do not get the users against us".

When learners experience a sense of coping they are also more motivated to continue. In our case, the learners received *feedback* from the programme immediately on how they did after accomplishing exercises (Table 8).

4.5.2. Individual learner factor

Cognitive

individual learner
cognitive
affective
conation
social
learning history

Starting with the cognitive variable, most learners evaluated the level as relevant including some new elements and most evaluated the programme as neither to hard or easy to accomplish. The learners' reported that they had sufficient prior knowledge to use the programme and understand the instructions. No reported that they lacked the sufficient skills and

thereby we could not compare learners lacking the skills with learners having the skills.

There were associations between learners 'appraisals of e-learning experience and the use of the programme ($F(1,16) = 25.31$, $p < .001$) and understanding of instructions ($F(1,16) = 7.12$, $p < .05$). There were also associations between the learners 'appraisals of learning effects and the use of the programme ($F(1,16) = 133.52$, $p < .001$) and understanding of instructions ($F(1,16) = 29.29$, $p < .001$), but not on the measure based on the scores from the value exercises (Table D-4).

Affective

In the interviews with the e-learning firm, the affective and motivational components were mentioned as a key issue when it comes to designing successful e-learning. What evokes emotions is easier to remember:

> *"Motivation* is important, to try to appeal to inner motivation by making exiting, dramatic and relevant programmes with situations they can recognise. Few manage to make programmes that evoke emotions. I wished that it was possible to make e-learning programmes that made people cry."

The learners reported that the programme was fun to use or otherwise were positive when speaking about the use of the programme, which supports that the affective component is a critical issue when it comes to conduction successful e-learning. The affective component was not included in our survey.

Conation

As indicated in the citation above, efficient e-learning appeals to the motivation of learners by being exiting to use. The e-learning programme also included incentives directed towards the external motivation of the learners. Appealing to inner motivation seems to be more important for conducting efficient e-learning. It was important for most learners to accomplish the programme. Their motivation was also affecting the e-learning outcome and thereby a critical issue for conduction successful e-learning. Motivation determined learners' appraisal of e-learning experience ($F(1,44) = 3.95$, $p < .05$). In addition, there was a tendency between motivation and learner appraisals of learning ($F(1,44) = 3.59$, $p < .07$). When scrutinising this, motivated learners believed that the e-learning programme would affect their work performance in appositive direction ($F(1,44) = 10.90$, $p < .01$).

Social

It is hard to decide based on the interviews to what degree the social aspects are critical for the e-learning outcome. Many pointed out in our case that it is a lonely learning situation, but ok. This might inflict upon the motivation to attend e-learning in the future. Anyhow, the e-learning can be a programme for presenting ideas and models of action, but to be considered learning the knowledge and skills must be put into action outside the e-learning programme in a social setting. The idea of replacing all learning and training with e-learning met resistance, mostly due to the limited social aspect of e-learning. It appears that a combination of traditional and e-learning is preferred.

Learning history

Learning history, in terms of years worked in Expert shop, IT experience and level of education did not inflict upon the e-learning outcome. We tested this by conducting regression analysis (Table D-4)

4.5.3. Organisational support

Presentation

organisational support
presentation
access
incentives
safety
assistance

E-learning does not implement itself, it must be organised and managed and supported by the organisation implementing the e-learning. The e-learning firm especially emphasises the role of *leadership* and *time* as critical issues. It is a challenge to reach all learners in the target group. Executives play a central role to reach this objective.

> ”It is important that the leaders see it as their responsibility. Even bad programmes can be successful if the leaders are following up. When they are in, things happen. In the case of Expert, the programme was all ready rooted centrally. It was important to get the head of shops involved. What they say and mean is important. They set the culture“.

The presentation of the e-learning programme reflects the executives’ attitudes, and signals to the employees the importance of the e-learning. The Expert e-learning project was deeply rooted among the executives centrally, but not to the same extent among the executives in the shops, i.e. among the head of shops. We think that this influenced the outcome of the e-learning for the employees. As mentioned before, the information the head of shops passed on to their employees reflected the information the received themselves. To reach all participants with the correct *information* was a

challenge and a possible success criterion. In our Organisational learning model the variable presentation includes how the e-learning is presented to the employees by the leadership.

We asked the learners about the presentation and priority of the e-learning programme in their shop. Around half of the learners were satisfied with the presentation of the programme and two thirds reported that e-learning were given priority. The learners' appraisal of the priority given the e-learning programme were associated with their appraisal of learning effect ($F(1,14) = 19.33$, $p < .001$) and to a less degree with their appraisal of the e-learning experience ($F(1,14) = 4.12$, $p < .07$).

Access

Time was second success criteria mentioned by Involve AS. For e-learning to have effect, learners must be given time to accomplish it. This again connects to the attitudes of the executives. If they give e-learning a high priority they will make sure the employees accomplish the e-learning, release time this and upgrade the technology when necessary. Our case confirmed this. The head of shops claimed that it was a challenge to find time for the e-learning project, both for themselves to attend meetings and for learners to go through the programme without disruption.

There were associations between access in terms of time and the learners evaluations of learning effect ($F(1,14) = 13.22$, $p < .01$) and e-learning experience ($F(1,14) = 13.10$, $p < .01$), but not on the outcome measure from the e-learning programme. Nevertheless, this confirms that access in time is a critical issue.

The technological claims were easier to meet. Although many computers could not run the sound features, these were not necessary for completing the programme. The statistical analysis shows that access to computers were associated with e-learning experience ($F(1,14) = 14.69$, $p < .01$) and learning outcome ($F(1,14) = 23.28$, $p < .001$). Additionally, the functioning of the e-learning programme were associated with e-learning experience ($F(1,16) = 16.52$, $p < .01$) and learning outcome ($F(1,16) = 30.67$, $p < .001$). Again, learning measure based on the scores on the value exercises in e-learning programme were not associated with these variables. *Technological access*, inevitable, is an additional success criteria.

Incentives

We have already touched upon the role of motivation. The e-learning firm built in elements in the programme directed towards external motivation of the learners. Still, the incentives directed towards inner motivation seem more important. The results of the statistical analysis support this. The learners' appraisals of the importance for their career to accomplish the programme were associated with appraisals of learning effect ($F(1,14) = 13.58$, $p < .01$), but not with their appraisals of e-learning experience and learning effect based upon the value exercises in the e-learning programme. For e-learning outcome, incentives directed towards the internal motivation of learners are crucial, but does not inflict upon their experience of e-learning.

Safety

In our case safety was not an issue concerning the learners and thereby not important for conducting successful e-learning. We included this aspect in the survey and our item were associated with learning outcome based upon the results of the value

exercises ($F(1,17) = 4.70$, $p < .05$). This indicates that safety is associated with learning effect, even though the learners' appraisals did not point in the same direction. We cannot decide if learners with bad performance were more concerned with the safety issue or if the direction of the causal relationship is the opposite. Safety issues influences the e-learning outcome according to our model.

Assistance

The project managers in Expert and people from Involve AS mentioned support as success criteria for e-learning. When contacted, the project managers in Expert helped the learners and head of shops. The project managers in turn contacted Involve AS when they needed support or discovered errors in the programme. One from Involve AS formulates it like this.

> "It is important to have a project manager inside, especially in faces of implementation, a safe person, trusting what we delivered. Before, we considered the project when we delivered the programme. Now we do not consider it delivered before people have learned."

In the survey, we asked the learners if they could go though the programme without help of others. Few reported that they needed help. The learners' responses on this item were associated with their appraisals of e-learning experience ($F(1,16) = 7.11$, $p < .05$) and with learning outcome ($F(1,16) = 57.04$, $p < .001$). These results indicates that learners able to accomplish the programme by themselves where more positive in their appraisals of e-learning and performed better than those who did not.

Table 7. Organisational learning model and critical issues for successful implementation of e-learning, summary

Variable	*Short description of variable*	*Critical issue*	+/-*
Individual learner factor			
Cognitive	Learners have sufficient knowledge and skills to run the programme. Learners understand the instructions and the content suites the learning needs of learners, i.e. within *zone of proximal development*	Yes, both when it comes to learning effect learner experience of e-learning	+
Affective	The programme appeals to affective aspects. The use of the programme is associated with positive feelings	Yes. Most likely connected to e-learning experience and learning effect, but must be confirmed by other studies	(+)
Conation	Learners motivation to accomplish the e-learning programme	Yes, significant results when it comes to the e-learning experience and close to significant with learning effects	+
Social	Referring to the social aspect of the learning situation, if the learners feel comfortable in the learning situation	We cannot tell on the bases of the results in our study.	0
Learning history	The role of learning experience, knowledge of the content of the programme and ICT	No. There learning history was not associated with neither e-learning experience nor learning effect	-
Organisational support factor			
Presentation	The priority given e-learning, information provided the learners	Yes, most likely. Presentation is associated with e-learning experience and learning effect	+
Access	Accessible computers meeting the technological claims of the programme. Sufficient time for learners to accomplish e-learning	Yes, access in time and technology are associated with e-learning experience and learning effect	
Incentives	Incentives directed to internal and external motivation of learners	Yes, incentives directed towards internal motivation of learners seem more crucial than incentives directed towards external motivation and is associated with learning effect, not e-learning experience	+
Safety	The learners experience the learning situation as safe. The	Partly confirmed as a critical issue when it comes to learning	0

	learners' actions and responses is not traceable to the individual learner	effect not e-learning experience. More studies needed	
Assistance	Help and assistance available when needed	Cannot tell the role of assistance when it comes to the individual learner. Most likely a critical issue, especially assistance available for the firm implementing e-learning	(+)

* "+" indicates that the variable is a critical issue

"0" indicates that the one cannot decide the relevance of the variable

"-" indicates that the variable is not a critical issue

"()" indicates a partly confirmation or disconfirmation of the variable as a critical issue

4.5.3. Additional findings: Critical issues

Designing successful e-learning depend on an thoroughly *analysis* of the individual learners and the organisation implementing e-learning. On the individual level, who is the target group? What are the learning goals and the relevant information, knowledge and skills? On the organisational level, what needs to change? What are the learning problem and the organisations' learning style?

> "One must have an understanding of organisation, organisational structure and target group for what you shall do. People are different, differs in abilities, preferences and learning styles. What do they need to change"?

The analysis scrutinises the difference between present state and the aims of visions of the organisation. This is in line with Nonaka (1991). Successful e-learning functions as a bridge between the visions and the every day experiences of the employees. Successful e-learning is *customised* e-learning, customised to the needs of the individual and the organisation.

In addition, *testing* and *evaluation* emerged as prerequisites for successful e-learning. As we experienced with the logging problems in our case, there are many pitfalls in technology. Testing of the e-learning programme can detect errors and faults in the programme, and evaluation can fetch the experiences and learning outcome of the learners. The participants from Involve AS stated that one need to test the communication and function of the programme according to the learning goals. One needs high quality test routines and select representative users to express what they think about the use. When it comes to evaluation, this can be formative or summative. In our case, the programme embedded the questions of our survey. It was summative since it provided us with information about how to conduct successful e-learning. Evaluation can also be formative, which makes it possible to adjust the e-learning programme along as the learners use it. Involve AS had close contact with the project managers in Expert. In the implementation phases of the programme, they made changes in the programme a long as they got feedback from the learners.

Even though the learners and head of shops held a positive attitude towards the e-learning programme, a common response was that this project alone would not lead to large improvements. If repeated though, Learners and head of shops impressed a positive attitude and belief that e-learning can help them to be better at what they do and thereby increase sale, but nobody believed that this project alone would lead to large improvements. If repeated with similar content for new employees and new programmes with new content, several expressed that they thought this could be the way to go. On the other hand, the idea of replacing all learning and training with e-learning met resistance, mostly due to the limited social aspect of e-learning. It appears that a combination of traditional and e-learning is preferred. The challenge

then, is to find the best way for transferring the content according to the needs of the organisation utilising the strengths of the methods available weighting the costs and benefits when planning the learning and training.

Table 8. Additional critical issues emerging from our study

Issue	*Short description of issue*	*Implications*
Learning object (content and design)		
Lerner activity	The key feature of e-learning is a high degree of learner activity	Successful e-learning programmes are design to utilise learner activity to the maximum
Recognition	E-learning programmes can simulate contexts, simplifies the content	Successful e-learning simulates contexts, which learners recognise and focuses upon the most relevant features of the content and remove non-relevant decisions
Learning object (development)		
Analysis	Analysis of individual learner and organisation: characteristics, learning styles and learning goals	Successful e-learning rests upon a thoroughly analysis on the levels of the individual learners and the organisation
Testing	Testing of the programme on extreme users making sure the technology works as planned and the technological claims are met	Successful e-learning rests upon high quality test procedures
Evaluation	Make adjustment and correct errors in the programme. Improve coming programmes	Successful e-learning rests upon the skills of the e-learning providers. Evaluation increases the skills and know-how about successful e-learning
Implementation		
Leadership	The implementation must be organised, managed and provided the resources needed	Successful e-learning is deeply rooted in among executives in the firm implementing e-learning

4.6. Summing up

4.6.1. Implementation

The shops differed in their experiences of implementing e-learning. The head of shop received different amount of information, which in turn inflicted upon the information the learners received. When the programme was launched on Extranet, the use of the programme more or less explained it self. The practice of using Extranet for ordering commodities, receiving information about products etc. was already established throughout the chain. The infrastructure were present, the only thing new was to use it for learning and training.

A greater challenge was finding time for the learners to go through the programme without disruption and for head of shops to attend meetings. The technological claims were easier to meet. All though many computers could not run the sound features, these were not necessary for completing the programme. External incentives, like the lottery and certification test, were important for some. Even more important were the features directed towards the internal motivation of the learners.

Safety issues did not seem to matter when it comes to implementation. Anonymity represented the safety aspect in this study and was of small if any concern for the learners using the e-learning programme. Safety did not matter according to the learners. The project manager in Expert Norway and people involved from Involve AS had contact during the implementation of the programme for correcting errors and upgrading the programme.

The group of learners were diverse when it came to experience with IT, working experience and level of education. Still, the programme seemed to capture the heterogeneity. The programme evoked mostly positive feelings even though the learners were unable to be more specific when describing them. Anyhow, most of the learners found and the content relevant and the programme interesting to use. The social aspect of the learning experience was OK, but solitary. Traditional learning methods are more social.

4.6.2. E-learning outcome

In general, the learners had positive experiences with the e-learning programme. All of the learners and head of shops interviewed agreed that they would like to use similar programmes again. E-learning is flexible in time and place, traditional learning is flexible in content. It is also cheaper for the shops since the shops avoid the costs of sending employees away and hiring substitutes.

The results indicate that e-learning can be a measure for conceptual and operational learning, leading to new knowledge and skills and may be a vehicle for changing firms' *theories of action*. Most learners reported that the programme provided them with new knowledge or confirmed what they already knew. Our measures of learning effects from the e-learning programme and the learners' appraisals confirmed this. The programme had an effect on the learners' knowledge of Expert's values, the content in the operation handbook, and the skills of using the digital operation handbook.

The project managers reports indicate that e-learning can be a tool for including all the individuals working in the shops. The possibility for reaching all members of an organisation is one advantages of e-learning. The programme influenced the feeling of being part of Expert.

4.6.3. Critical issues

Tables 7 and 8 lists critical values for conducting successful e-learning uncovered in our study. *Learner activity* and *recognition* are key words for designing successful. Successful e-learning programmes activates, engage the learner emotionally as well as intellectually, motivates, fits the needs of the learner and the organisation implementing e-learning and includes relevant information simulating the teacher learner relationship as well as relevant situations.

Individual learner factor

Most learners found the content appropriate and had the skills needed to accomplish the programme. In Vygotsky's terminology, the content were within the learners' *zone of proximal development*, i.e. where learning occurs (Miller, 1993). These results indicated that *cognitive* issues are critical for conducting successful e-learning.

The interviews confirmed that *affective* aspects were important for the e-learning outcome. Unfortunately, we could not test this statistically but the affective component seems to be a critical issue for conducting successful e-learning.

Conation and features appealing to inner motivation are additional success criteria. Motivated learners differed in their appraisals of e-learning experience and learning effects, especially on work performance. Finally, we could not decide whether the

social aspect is a success criterion or not. The results of the interviews indicate that the social aspect of learning is an issue to consider. Learners differ in learning styles. Some prefer to be alone others prefer to learn together with others. It appears that a combination of traditional and e-learning might be the best. *Learning history* of the learners did not inflict upon e-learning outcome. The answer to this is one of two. Either the programme embraces the learners of all categories or the learning history is not a critical issue.

Organisational support factor

Our model includes presentation as a critical issue concerning successful e-learning. Through the interviews with the e-learning firm, *leadership* emerged as a critical issue. Leadership connects to the presentation variable by reflecting the importance and priority the leaders give e-learning. In our case, this influenced the information provided the learners. *Access* in term of time as well as technology is critical issues, which the interviews with the head of shops, and the statistical analysis confirm.

For e-learning outcome *incentives* directed towards inner motivation is crucial, but it does not inflict upon their experience of e-learning. The *safety* aspect was absent from the learners responses in the interviews. Many did not know if somebody else could see their results and responses. We cannot decide if learners with bad performance were more concerned with the safety issue or if the direction of the causal relationship went the other way. The last variable in our model is *assistance*. The experience of the e-learning provider as well as the statistical result indicates that assistance is a success criterion.

In addition, two critical issues emerged concerning the development of e-learning, i.e. *analysis* and *testing*. Successful e-learning is depending analysis of the individual learners and of the organisation. A thoroughly understanding of the learning goals and of the organisational structure is immanent to successful e-learning. High quality test procedures before launching the e-learning in combination with close monitoring in the first days after the launch, would reveal mistakes and secure corrections of errors and faults.

4.6.4. Organisational learning model

We used our Organisational learning model to explore the implementation of an e-learning programme. We found that the model targets several issues concerning successful e-learning. Most of the variables concerning the organisation implementing e-learning were relevant, i.e. the variables included in the individual learner and organisation support factors. The social and learning history variables from the individual learner factor were exceptions. We could not decide the role of the social variable. The same was for the safety variable from the organisation support factor. The learning history variable was the only variable not affecting the learning outcome and learning experience. Leadership emerged as an additional critical value and embraces the presentation issues as well as focusing upon the importance of leadership and organisation. We replaced the presentation variable with leadership variable in the model. Figure 4 shows the adjusted model. We put the social and safety variables in brackets since we do not know the relevance of these yet. The additional critical values emerging in our study concerns the development and design

of e-learning and not included in the model. We need more studies for further confirmation and adjustment of the Organisational learning model.

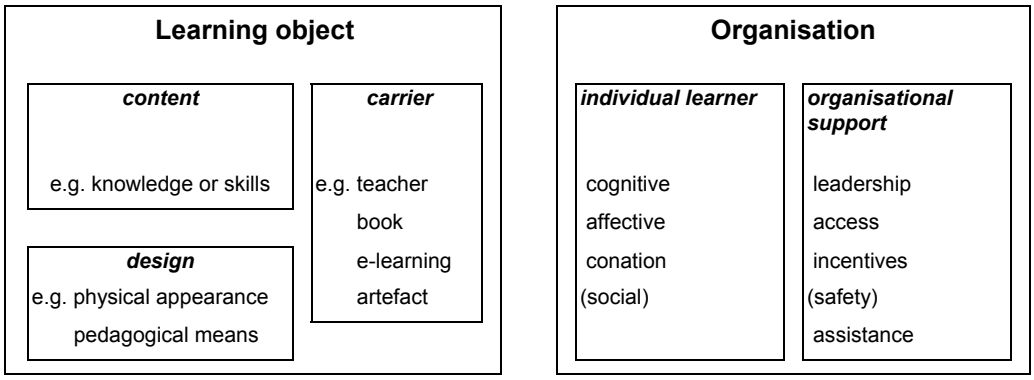


Figure 4. Organisational learning model (adjusted)

5. Conclusive remarks

In this study, we explored the use of e-learning technologies for knowledge sharing and organisational learning in a competitive firm context, and identified critical values for implementing successful e-learning. We combined evidence from literature with results from an empirical case study. The aim of the literature study was twofold. First, we wanted to illuminate upon the theoretical and contextual background in which the e-learning technologies have emerged. Second, we wanted to explore what e-learning technologies are and why they matter.

The literature differs between to types of knowledge, i.e. knowledge as information and knowledge as skills or capabilities (OECD, 1996). The former contains mostly explicit elements, the latter mostly tacit elements. Knowledge differs from information by being contextual and meaningful for individuals, which opens for individual differences in the acquisition of knowledge and skills. Our theoretical inquiry resulted in our Organisational learning model (figure 1), which opens for individual differences in learning. This includes features of the learning object, in our case an e-learning programme, in addition to characteristics of the organisation implementing the learning object.

The literature defines e-learning as technology-based learning. In e-learning, technology replaces the classroom and teacher and works as a knowledge carrier between the teacher and learners. The transition into a knowledge economy, recent developments within ICT, globalisation and changes in the premises of conducting business as well as changes in demographics are important aspects of the context in

which the e-learning technologies has emerged (E-learnframe, 2000). The economical arguments for using e-learning for firm education and training are strong. A common experience of e-learning is that it is independent of boundaries in time and space. E-learning is expensive to develop but once developed, it is cheep to distribute. A critique directed towards e-learning is the lack of flexibility once developed, which makes the content block and the preceding analysis important.

The amount of literature concerning e-learning and the conduction of successful e-learning are overwhelming. Articles and studies often bases upon general assumptions and experiences, not upon structurally collected empirical data. The maturation of e-learning technologies will put new strains on quality of the products and increase the interest for understanding why it works, documenting effects, and on how to conduct successful e-learning. By conducting a case study, we aimed to narrow the gap between the e-learning in theory and practice in a competitive firm context.

The case study was instrumental and multi-methodological (Stakes, 1994), the object to explore e-learning in practice. We focused on implementation of e-learning in a competitive firm context and critical issues for implementing successful e-learning. We used our Organisation learning model to organising the study and observations. The case consists of an e-learning programme developed and customised to enhance knowledge of firm values and sales skills of frontline employees (N = 770) in a chain of shops in Norway selling consumer electronics.

Our results confirm that e-learning can be a mean for knowledge sharing and organisational learning in a competitive firm context: i.e. for sharing tacit and explicit

elements, leading to new knowledge and skills through conceptual learning and operational learning. The e-learning programme in our case included pictures, logos, sound and short storylines, simulating and recreating the firm context as well as situations that frontline employees encounter in everyday work. More specific, the results indicate that the e-learning programme lead to learning, affected the feeling of being part of Expert, and would influence work practice. Most likely, e-learning can be a mean for changing and influencing firms' theories of actions.

Several critical values emerged in the case study for implementing successful e-learning. When it comes to the development of e-learning, especially two critical issues emerged, i.e. analysis and testing. A thoroughly understanding of the learning goals, the individual learners and of the organisational structure, in combination with solid test procedures is immanent to successful e-learning. Successful design of e-learning rests upon a good analysis. E-learning is about doing and experiencing rather than passive receiving. The possibility for recreating context and simulating situations, which learners recognise, is one of the strength of e-learning. Efficient e-learning includes these aspects, which mostly involve simplifications removing non relevant choices and aspects. Successful e-learning programmes activates, engage the learner emotionally as well as intellectually, motivates, and suites the needs of the learner and the organisation implementing e-learning by including relevant information simulating the teacher learner relationship as well as relevant situations.

An organisation giving high priority to e-learning by providing learners with information, access in terms of time and technology, incentives appealing to internal motivation of learners, have a good chance of implementing successful e-learning. A

precondition is that the executives are supportive to implementing e-learning. It is hard, if not possible, to change an organisational culture if the executives are ignorant or hostile to the changes. As with all new technology, it takes time and effort before it is possible to maximise the effects and benefits of the technology. In our case, the e-learning project was the first time experience for most learners and the organisation implementing the e-learning programme. In future projects, the benefits will most likely increase provided that the experiences from the "Expert on a day" project becomes part of the organisations knowledge and made accessible when planning future learning and educational practices. The challenge is to find the best way for transferring the content according to the needs of the organisation utilising the strengths of the methods available weighting the costs and benefits when planning the learning and training.

Due to the problems with the logging of the data in the e-learning programme, the result of our survey carries some weaknesses. Still, seen in connection to the interview data, the overall validity is satisfactory. The main contribution of our study is the empirical evidence indicating that e-learning can be a tool for knowledge sharing and organisational learning in a competitive firm context. We illuminated on critical issues of conducting successful e-learning. We believe that the results and the variables included in our Organisational learning model are relevant for other firms implementing e-learning.

Appendix A

Interview guide, project manager Invole AS: The e-learning programme "Expert on a day"

Description of e-learning tool	1) Short description of e-learning tool - aim
	2) technical facts - LMS platform, standard
	3) Pedagogical means used in the programme - why it is expected to lead to learning - the pedagogical arguments for the different aspects of the programme
	4) Level of customisation, organisational and individual - why, arguments
Implementation	5) Describe the implementation process: - presentation in chain and shop - means, how - support - timing
	6) What are the critical factors for success, i.e. leading to efficient learning?
	7) Problems, challenges of implementation of the programme
Effect	8) Effects of programme so long
	9) Feedback from Expert, shops, users
	10) Open question
	11) Pros and cons of e-leaning

Interview guide, Senior Advisor Involve AS: E-learning in general

	10) What is e-learning? What does it consist of - describe the technology - core issues
	11) Historical and contextual background for the emergence of e-learning - technological development - economical need
	12) Why does e-learning work - means and tools to obtain learning - What are the possibilities of e-learning - effect
	13) What are the critical issues concerning - development - implementation - common pitfalls - success criteria
	14) pros and cons compared to traditional learning
	15) Limitations and possibilities according to type of content, knowledge (transfer) - text vs. context - skills vs. knowledge, information

Interview guide, project manager Expert Norway AS

1: Background for choosing e-learning

a) Who came up with the idea of trying e-learning?

b) Who made the decision?

c) Motives for choosing e-learning (costs, organisational issues, etc.)

d) Resources available (time, persons, money, etc.)

c) Why Involve AS?

2: Previous experiences with e-learning

a) Type of projects, effects, results, good or bad

b) Other learning systems (methods, results)

3: Expected, wanted results, effects?

a) Specific learning goals

b) In terms of increased sale (how much)

c) Other

4: Organisational issues

a) Can you give a short description of the organisation (type, map, goals)

b) How is the project organised?

c) Who is responsible?

d) Implementation, how is it planned to be done (schedule)?

e) Parallel projects, learning systems?

5: Background questions (categories)

a) your role in the project, mandate,

b) other important persons, groups

c) description of target group

d) number and types of shops (Expert Bonus – Expert), ownership (local – Expert Norway AS)

Appendix B

Interview guide, learners

Implementation	
Presentation	1) How was the project introduced? - by whom - when - why e-learning
	2) How important is the e-learning project for your shop (after the presentation)? - why/ why not
Assistance	3) How was the project organised in your shop? - practical issues, e.g. when to go through the programme, information of the how to start and use it, support available when needed
Access	4) Available computers?
	5) Sufficient time to go through the e-learning programme? - why / why not
	6) Sufficient PC capacity, any problems running the programme?
Learner history	7) Sufficient (prior) knowledge of computers /computer programmes to use the programme?
Safety	8) Issues concerning anonymity, result being treated anonymous?
Incentives	9) Any incentives, benefits for accomplishing the programme? - by shop - expert - personally

E-learning tool	
Use	10) Did you take the programme seriously?
	11) How did you approach the programme (click on all, read first, etc.)?
	12) How long did it take to complete the programme?
	13) Your overall impression of using e-learning tool?
Cognitive	14) How was the level of content according to your prior knowledge? - to high, to low, ok - repetition vs. new learning
	15) Was it hard or easy to accomplish the programme?
	16) Was the programme customisable to your personal need?
Conation	17) How motivated were you to go through the programme?
	18) Was the use of the programme motivating in it self?
Affective	19) How did you feel about using the programme? -did the use evoke any feelings, or reactions
	20) What did you think about using the programme?
Social	21) How did you experience the learning situation (safe, alone, OK, etc.)?

E-learning outcome	
Firm feeling	23) Do you feel as part of Expert Norway? - did the programme inflict upon this?
Lerning effect	24) Did the programme help you to understand firm routines?
	25) Did you learn by using the e-learning tool?
	26) To what extent have you learned through the e-learning programme useful, relevant in your work?

	27) Has it already or you think it will inflict upon how you do your work in practise?
E-learning experience	28) Would you like to use e-learning again?
	29) Pros and cons compared to traditional learning (classroom, courses), in terms of efficiency etc.?
	30) Do you think e-learning is a good or bad way of learning? - explain
	31) Open question: anything you want to add concerning the programme, organisation of it in the shop and the use of it?

Interview guide, Head of shops

Implementation, chain	
Presentation	A) How did Expert Norway introduce the project? - choice of e-learning - intentions
	B) How was it implemented, organised centrally? - did you get the material necessary - sufficient information and support

Implementation, shop	
Presentation	1) How was the project introduced in the shop? - by whom - when - why e-learning
Organisation	2) How long did it take to implement it?
	3) Any problems, challenges?
	4) How important was the e-learning project for your shop? - why/ why not
	5) How was the project organised in your shop? - practical issues, e.g. when to go through the programme, information of the how to start and use it, support available when

	needed
Access	6) Available computers?
	7) Sufficient time for employees to go through the e-learning programme? - why / why not
	8) Sufficient PC capacity, any problems running the programme?
Assistance	9) How was the project supported centrally from Expert Norway? - what kind - did you get it when needed
Safety	10) Issues concerning anonymity. How is the result being treated?
Incentives	11) Any incentives, benefits for accomplishing the programme? - by shop - expert Norway - personally
E-learning experience	12) What is your overall impression of the e-learning tool?
Cognitive	13) Relevance of content for work in shop?
Learning effect	14) Notable effects? - in terms of learning - in practise - sales
Affective	15) What are the major reactions of employees to the programme?
Evaluation	16) Would you like to use e-learning again in your shop?
	17) Pros and cons of e-learning compared to traditional learning (classroom, courses):
	18) Overall evaluation of the project and implementation: - critical factors - lessons learned

Appendix C

Survey embedded in the e-learning programme "Expert on a day"

Background information		
	a) Name of shop	
	b) Region	
	c) The shop I work in is owned by	1 = Expert Norway 2 = local shopkeeper
	d) Gender	1 = female 2 = male
	e) Position	1 = salesperson 2 = head of department 3 = head of shop 4 = extra help 5 = cashier's staff (?) 6 = storesman (?) 7 = other
	f) Employment	1 = full-time, 100% 2 = part-time, 50% or more 3 = part-time, below 50%
	g) Age	
	h) How many years have you been working in the shop?	
Learning history	i) Level of education	1 = primary and secondary school 2 = upper secondary school, 1 year 3 = upper secondary school,, 2 years or more 4 = higher education/university, 1-2 years 5 = higher education/university, 3 years or more
	j) How will you assess your self as a user of IT (Internet, computer programmes, PC)?	1 = novice 2 = have some experience 3 = average user 4 = experienced user 5 = expert
Conation	k) How important is it for you to complete the training program?	1 = not important at all 2 = of some importance 3 = important 4 = very important

Survey concerning learners' appraisal	
	1) It was easy to start the programme
Access	2) The computer had no problems with running the programme (e.g. sound and graphics worked well)
Assistance	3) I accomplished the programme without help of others
	4) The goal of the programme was clear
Cognitive	5) I understood the instructions
	6) I knew where I was in the training programme
Cognitive	7) The programme was easy to use
Safety	8) My boss will not know what I answered
Presentation	9) My boss and/or others informed me in advance of the content and goal of the training programme
	10) My workplace give priority to the training programme
Access	11) The shop set of sufficient time for me to complete the training programme
	12) It was easy to gain access to a computer to accomplish the training programme
Incentives	13) The shop reward me for completing the training programme
	14) It is good for my career to complete the training programme
Learning effect	15) I have become familiar with the content of chapter 1,5,7 and 9 in the operation manual by using the training programme
	16) I learned how use the electronic operation handbook
	17) I know the values of Expert better after completing the training programme
	18) I will do a better job after completing the training programme

E-learning experience	19) I would like to use similar training programmes again
	20) I prefer regular training like classroom teachings, courses and seminars, before training programmes like this

Appendix D

Table D-1. Frequencies on items in survey concerning learner appraisals

Survey item	*Options*, *N* (%)				
	Totally agree	Partly agree	Both	Partly disagree	Totally disagree
9. I was informed about the content and goal of the e-learning programme (*N* = 22).	9 (41%)	2 (9%)	6 (27%)	5 (23%)	-
10. My workplace gives priority to the e-learning programme (*N* = 22).	14 (64%)	4 (18%)	3 (14%)	1 (5%)	-
12. It was easy to get access to a computer (*N* = 22).	18 (82%)	1 (5%)	2 (9%)	1 (5%)	-
2. The computer had no problems running the programme (*N* = 25).	19 (76%)	3 (12%)	2 (8%)	1 (4%)	-
11. The shop provided enough time for me to accomplish the programme (*N* = 22).	18 (82%)	2 (9%)	-	2 (9%)	-
13. The shop rewards me for completing the e-learning programme (*N* = 22).	4 (18%)	1 (5%)	-	8 (36%)	9 (41%)
14. It was good for my carrier to accomplish the e-learning programme (*N*= 22).	13 (59%)	4 (18%)	3 (14%)	2 (9%)	-
8. My boss will not know what I have responded (*N* = 22).	12 (55%)	2 (9%)	4 (18%)	3 (14%)	1 (5%)
3. I could accomplish the programme without asking others for help (*N* = 25).	19 (76%)	4 (16%)	-	1 (4%)	1 (4%)
5. I understood the instructions in the programme (*N* = 25).	19 (76%)	4 (16%)	1 (4%)	1 (4%)	-
7. It was easy to use the programme (*N* = 25).	21 (84%)	2 (8%)	1 (4%)	1 (4%)	-
19. I would like use similar training programmes again (*N* = 54).	31 (57%)	9 (17%)	13 (24%)	1 (2%)	-
20. I prefer traditional training like, teaching, courses and seminars before programmes like this one (*N* = 54).	16 (30%)	4 (7%)	25 (46%)	8 (15%)	1 (2%)

15. The e-learning programme has helped me learn the values of Expert (N = 54).	39 (72%)	11 (20%)	3 (6%)	1 (2%)	-
16. I have become familiar with chapter 1,5,7 and 9 in the operational handbook through the e-learning programme (N = 54).	25 (46%)	17 (32%)	10 (19%)	2 (4%)	-
17. I have learned to use the operation handbook (N = 54).	30 (56%)	14 (26%)	6 (11%)	2 (4%)	2 (4%)
18. I will do a better job after accomplishing the e-learning programme (N = 54).	25 (46%)	13 (24%)	13 (24%)	2 (4%)	1 (2%)

Table D-2. Participants level of education by gender

	Gender	
Level of education	Female	Male
Primary and secondary school (N = 71)	26	45
Upper secondary school, 1 year (N = 93)	43	50
Upper secondary school, 2 years or more (N = 436)	107	329
Higher education/university, 1-2 (N = 97)	12	85
Higher education/university, 3 years or more (N = 73	15	58
Total (*N = 770)*	*203*	*567*

Table D-3. Participants' appraisals of IT skills by gender

	Gender	
IT skills	Female	Male
Novice (*N* = 98)	61	37
Have some experience (*N* = 166)	64	102
Average User (*N* = 262)	67	195
Experienced user (*N* = 181)	7	174
Expert (*N* = 63)	4	59
Total(N = 770)	*203*	*567*

Table D-4. Means, comparison of means of Scores on value exercises in the e-learning programme

Scores on value exercise, before	$M = 4.90$, $SD = 1.54$, $N = 490$
Scores on value exercise, after (cert. test)	$M = 5.44$, $SD = 1.14$, $N = 451$
Comparison of means	($t(390) = 6.36$, $p < .001$)

Table D-5. Analysis of regression, e-learning outcome by variables in individual learner factor

	E-learning outcome		
Items, individual learner factor	E-learning experience	Learning effect, learner appraisal	Learning effect, e-learning programme
Cognitive			
7. It was easy to use the prog.	(F(1,16)=25.31, p<.001)	(F(1,16)=133.52,p<.001)	(F(1,16)=.66, p<.45)
I understood the instructions	(F(1,16)=7.12, p<.05)	(F(1,16)=29.29, p<.001)	(F(1,14)=.03, p<.90)
Affective	-	-	-
Conation			
k. Importance of completing programme	(F(1,44)=3.95, p<.05)	(F(1,44)=3.59, p<.07)	(F(1,342)=.18, p<.70)
Social	-	-	-
Learning history			
j. IT experience	(F(1,52)=1.10, p<.35)	(F(1,52)=.33, p<.60)	(F(1,389)=1.52, p<.22)
i) Level of education	(F(1,52)=.55, p<.50)	(F(1,52)=.04, p<.90)	(F(1,389)=.68, p<.45)

Table D-6. Analysis of regression, e-learning outcome by variables in organisational support factor

	E-learning outcome		
Items, organisational support factor	E-learning experience	Learning effect, learner appraisal	Learning effect, e-learning programme
Presentation			
10. My workplace gives priority to programme	($F(1,14)=4.12$, $p<.07$)	($F(1,14)=19.33$, $p<.001$)	($F(1,17)=.97$, $p<.35$)
9. My boss informed me about intentions	($F(1,14)=4.12$, $p<.07$)	($F(1,14)=2.69$, $p<.15$)	($F(1,17)=1.10$, $p<.35$)
Access			
11. The shop set of sufficient time for me…	($F(1,14)=13.10$, $p<.01$)	($F(1,14)=13.22$, $p<.01$)	($F(1,17)=2.80$, $p<.15$)
12. Access to computer	($F(1,14)=14.69$, $p<.01$)	($F(1,14)=23.28$, $p<.001$)	($F(1,17)=2.73$, $p<.35$)
2. The computer had no problems running the programme	($F(1,16)=16.52$, $p<.01$)	($F(1,16)=30.67$, $p<.001$)	($F(1,14)=1.80$, $p<.25$)
Incentives			
13. The shop will reward me for completing the programme	($F(1,14)=2.53$, $p<.15$)	($F(1,14)=1.47$, $p<.25$)	($F(1,17)=.37$, $p<.60$)
14. It is good for my career to complete the programme	($F(1,14)=1.80$, $p<.20$)	($F(1,14)=13.58$, $p<.01$)	($F(1,14)=.02$, $p<.90$)
Safety			
8. My boss will not know what I have answered	($F(1,14)=4.01$, $p<.07$)	($F(1,14)=1.96$, $p<.20$)	($F(1,17)=4.70$, $p<.05$)
Assistance			
3. I accomplished the programme without help of others	($F(1,16)=7.11$, $p<.05$)	($F(1,16)=57.04$, $p<.001$)	($F(1,14)=.78$, $p<.80$)

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